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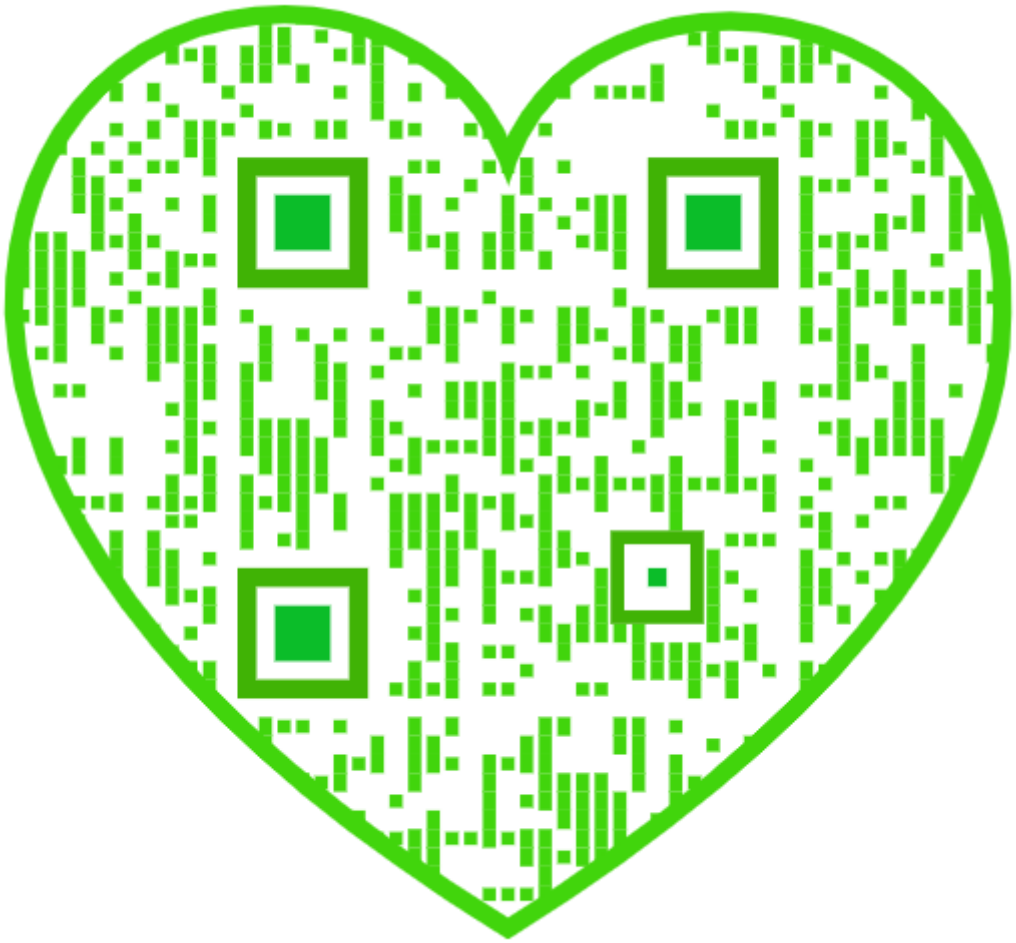

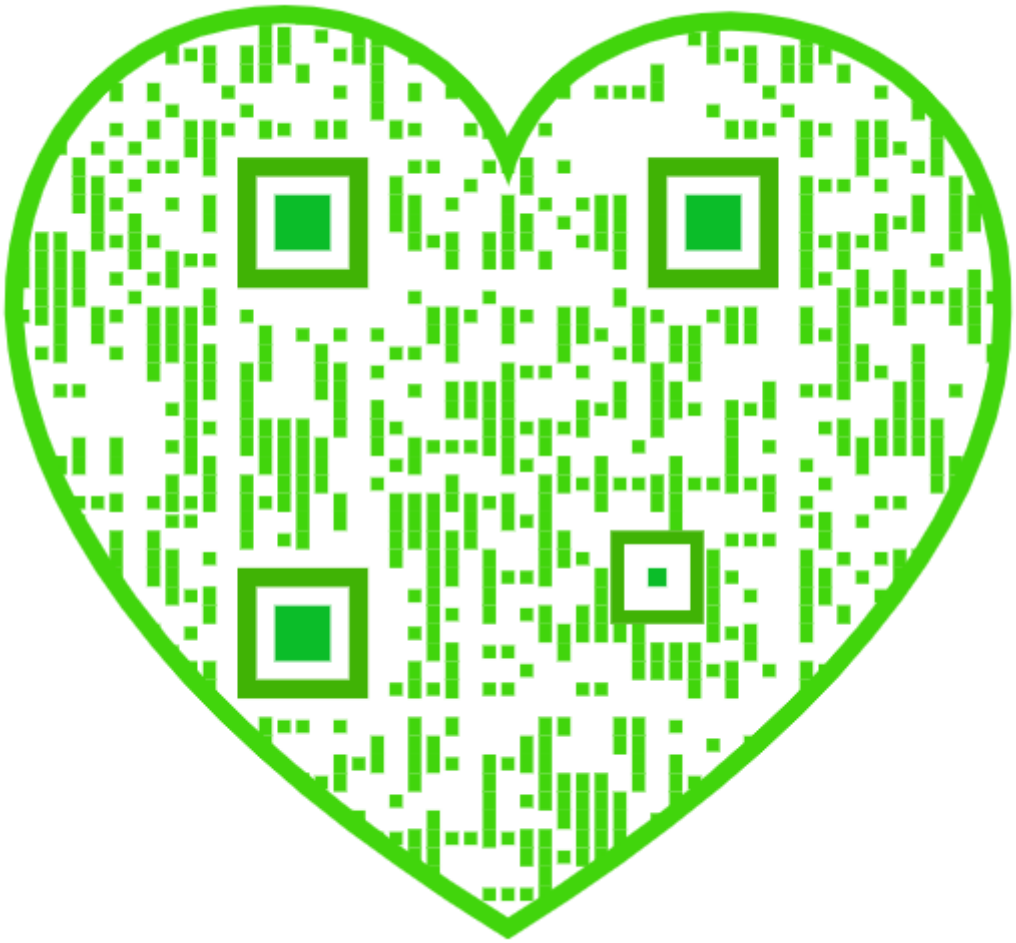

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THE TREE PLANTER

AND

PLANT PROPAGATOR

LONDON:
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INTRODUCTION.

The propagation of plants is a most useful and interesting art; and although in most cases it certainly requires care, patience, and perseverance, yet there is a pleasure connected therewith that is quite original in its nature, and those who are masters of the art of propagation are as far in advance of the ordinary course of gardening as an inventor of a piece of machinery is before the man who merely makes the machine according to a given plan.

The practical theory for the propagation of plants is scattered over the whole of the literature of gardening; so that if you want to find how to multiply a certain plant you may possess, probably you may have to buy or borrow some book, hard to come at, possessing the required information, before you dare venture to cut your plant for propagation, lest you should lose both the cuttings and the original, which is frequently the case. This has at times cost the loss of a man's professional reputation, and frequently his place too. It is true some books profess to embody the art of propagation of most plants, the information in which may be sufficient in detail for the experienced professional, while conveying mere hints not sufficiently definite for the novice. Here, then, I find good ground for the present attempt to produce a book which in itself shall meet the demand without further reference, trouble, or expense.

I well remember when I first took a lively interest in the art of propagation, as I was determined to

be a plant propagator and plant grower, what anxiety, research, expense, and loss of time I encountered to find how to proceed with some particular class of plant I had in hand. In the present pages I hope I have obviated the necessity for all this trouble, and I trust that under each head enough is detailed for all classes of plants and all classes of plant growers.

I think I may assert for a truth, that to become a proficient tree and plant propagator is impossible within a very short space of time without consulting works of reference, because it frequently happens that the propagation of some kinds may not practically come under the observation of a person once in his life. Yet by reading an article, and by working in the abstract on the subject, a young man may become more than half acquainted with the method of the propagation of the tree or plant. To be a successful forest-tree planter, a man should really know the true physical and functionary powers of the plant, and this can scarcely be practically known unless a man is a propagator: for instance, no one will grow Oak timber well unless he understands the nature of its physical powers and is aware of its peculiar construction, and so on with other trees and shrubs. Those who propagate them are well aware of the formation of the roots, and how the plants perform their functions below the surface, which, no doubt, is knowledge most vital for success.

The reader will observe that I have placed the most common classes of trees first. I have done so because they are of more real importance to man in general than the more ornamental classes; and again, these are generally passed over by most writers. I have placed the Oak first, as this grand forest tree should be cultivated to a much greater extent than it is. There are localities which will not grow the Oak well, and there are others which will not grow the Elm; and if a man plants these indiscriminately, without making the necessary observations beforehand, the probable result will be timber at some future time not worth much. I once

knew a timber merchant who purchased an entire estate of Oak timber, consisting of a little less than 20,000 trees of a good size, clean, and to all appearance of first-class quality; but it was found to be otherwise, I was informed, when the timber was cut down. Many of the trees were worthless for shipbuilding in the centres, the hearts being partially decayed. This was on account of the locality not suiting the Oak. So it is with reference to other kinds of trees—as, for instance, the Apple, which will luxuriate in some places, and in others will remain almost stationary and not get much larger; it will neither grow nor die.

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THE TREE PROPAGATOR AND PLANTER.

BOOK I.

TIMBER, PARK, AND ORNAMENTAL-FOLIAGED TREES.

The Oak.

The Oak is multiplied by seed for ordinary timber, and for some rare kinds it is grafted on the common sorts. The acorns should be gathered as soon as ripe, and sown at once either in beds or drills; but if a large quantity should be required, it is best to sow the acorns in four-feet beds. Choose a nice, kind bit of ground, of a breify nature, with a small proportion of sand in it. This ground should be of a moderately moist nature, and pretty deep. It should be dug fifteen or eighteen inches deep, and well broken; when the whole bed is so prepared, turn four or five inches of the surface clean out on each side of the bed, leaving a level surface, on which sow the acorns as thick as they will lie in one layer, all over the bed, and then turn the soil that was dug out on to the seed, first breaking it moderately fine.

When the acorns are sown in drills, the ground must first be dug and made fine; the drills must be drawn not less than five inches deep with a heavy hoe. The acorns may be sown as thick as marrowfat peas are, and covered up in the same manner.

If it should be inconvenient to sow the acorns at once, they must be preserved from drought by keeping

them in a damp cellar or outhouse, covered over with ferns, old hay, or straw. They must be sown not later than February under any circumstances. The seedlings should remain three years in the seed-bed, and then transplanted to where they are to remain. It is not often convenient, but when it is, in order to get good old hearty Oak timber, the acorns should be sown where they are to remain for timber; for the Oak always makes a taproot much in advance of the top growth. This taproot is the secret of getting large and sound old timber; when an Oak-tree cannot maintain this chief organ, it seldom produces such timber. This was the reason why the old timber referred to in the Introduction was unsound at heart. This large quantity of Oak timber grew chiefly on a rocky subsoil, which prevented the majority of the trees forming that principal organ—the taproot. We find that self-sown Oak-trees produce the largest as well as the soundest timber.

In transplanting young Oaks for timber, care should be taken to maintain as much of the taproot as possible. This is contrary to the usual practice, which consists of cutting as much of it off as possible; but I have made my observations in this matter, and can confirm what I have said to be a fact.

The common Oak (*Quercus pedunculata*) requires a moist, stiff, strong clay to flourish in, and to attain to a healthy old age. The chief reason why some Oaks throw up suckers is because they cannot form a taproot—the subsoil does not suit them. Some kinds must be grafted to multiply them and to keep the sort true.

The *Quercus cerris* is used for stocks for most of the kinds requiring grafting. The grafting should be done during March and April. The graft should be put on the stock close to the ground, and the stock may be smaller or larger than the graft. Common whip-grafting, as adopted for pears and apples, may be the method, or, if the stock is much larger than the graft, rind-grafting may be employed; but it must be borne in mind that the bark of the stock must readily leave the wood (see page 149). Tie the graft in, and use

"grafting-wax" or clay. The Cork-tree (*Quercus suber*) and its varieties are grafted on the Turkey Oak. This Oak grows very rapidly, and soon forms a large spreading tree with a beautiful foliage.

All the varieties of the evergreen Oak are most useful and beautiful shrub trees, well adapted for the second tier of plantation forming, and also as single and conspicuous objects on a well-devised estate. They will bear cutting-in to any extent to keep them within the desired limits. I know of no subjects among the large-growing evergreens so well adapted for ornamental break shelter as the *Ilex* and the other varieties of evergreen Oaks, possessing as they do a thick and dark foliage. Many of them may be multiplied by seed, for they bear seed as well as the deciduous kinds.

Some theorists advise that the seed (acorns) should be dried before sowing, and that the sowing should take place in March. Now I beg to warn my reader against any such practice, or a total failure will ensue; for if acorns are allowed to dry much, they will never vegetate. What I have already said in reference to sowing I can vouch for.

There are about 112 or 114 varieties of the Oak, and although soil and situation have a great deal to do with the quality of the timber, yet there are some kinds of a much tougher nature than others. The following diagrams will give some idea of the quality of Oak timber grown on two different soils, and will serve as a guide for the merchant in the purchase of standing Oak timber. No doubt situation and the subsoil have everything to do with the quality of the timber. Now it must be admitted that well-grown English Oak is far superior to any other in elasticity and durability. Oak that is grown too quickly or too slowly is wanting in quality. In the former case it will be porous and brittle, with a larger proportion of what is commonly called "sap," and is of little or no value. In the latter case the timber will possess a considerably larger proportion of "heart" than in the former, but at the age of maturity, which is about one hundred years from

sowing the seed, the timber will be in a similar unsound state to that shown in the diagram, Fig. 2. Moreover, the timber will be less elastic, and not so good for ship-building as in the other kind.

The illustration Fig. 1 gives a fair idea of an Oak at the same age as Fig. 2, but which has grown on a suitable soil and in a good locality—a deep, tender clay, containing an average amount of natural moisture, not too elevated, nor in a supersaturated, swampy district. When the Oak is grown under such circumstances, and

Longitudinal sections.

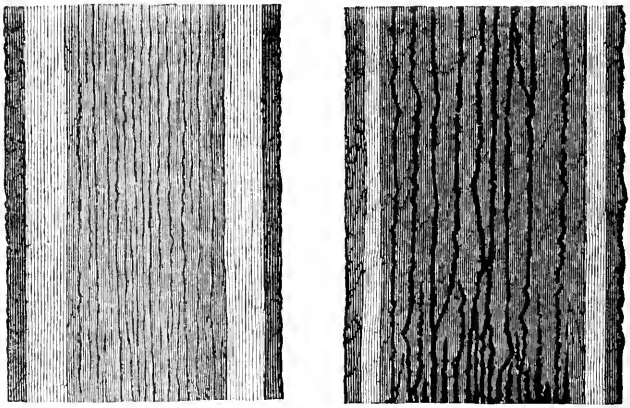

Fig. 1. Fig. 2.

Two Oaks, age 100 years.

maintains a good taproot, the timber will be considerably better in quality, larger in size, and more elastic than that shown in Fig. 2 at the same age.

Figure 3 shows the frequent state of the Oak when come to maturity, through cutting off some of its large limbs at fifty years old, hastening it more or less by ten years. 1 shows the effects of so doing. This is a deceptive kind of thing, for if the tree has grown freely, then the cut will be healed over at the age of maturity, as seen at 2, Fig. 3. And should

this tree remain much beyond the age of maturity, most probably the heart, 3, will be entirely worthless for any special work. In purchasing Oak timber, it is good policy to find out what the subsoil is, and then the age of the timber, for it is proved beyond a doubt that in most cases the heart is unsound after the tree has reached the age of 100 years, especially if the subsoil does not suit, as shown heretofore.

Longitudinal section.

Fig. 3.—A section of a well-grown Oak at maturity, showing the effect of cutting a large branch off when fifty years old, but which had healed.

Figure 4 is a fair illustration of an Oak growing on a dry, gravelly, or rocky subsoil, and in a very elevated locality. There are some specimens of this kind growing, or rather existing, on Dartmoor, in Devonshire, well worth the while of any person who may wish to see them. These Oaks are perhaps much smaller for their age—which may probably be 200 or 300 years—than any to be found. There they exist, but get no larger; nor can they, owing to the very elevated place in which they are situated, and the rocky soil on which they stand.

The way to plant Oaks.—When a plantation of Oak is to be made, it is a good plan to place the young trees three or four times thicker than what is required for the maturity of the timber. Plant at a distance of 4 feet apart every way, and when the trees get 10 or 15 years old, cut two down to within a foot of the ground in the spring, and bark them for the tanner, leaving every third tree for timber; these will be 12 feet apart, which will not be too close for good straight timber. Those cut out will give underwood. If the trees are planted 4 feet apart, an acre will take 2,770

plants to fill it. If the timber trees are left 12 feet apart, there will be about three hundred of them on the acre. If the young Oaks require trimming, it should be done while they are very young, in the spring, and with

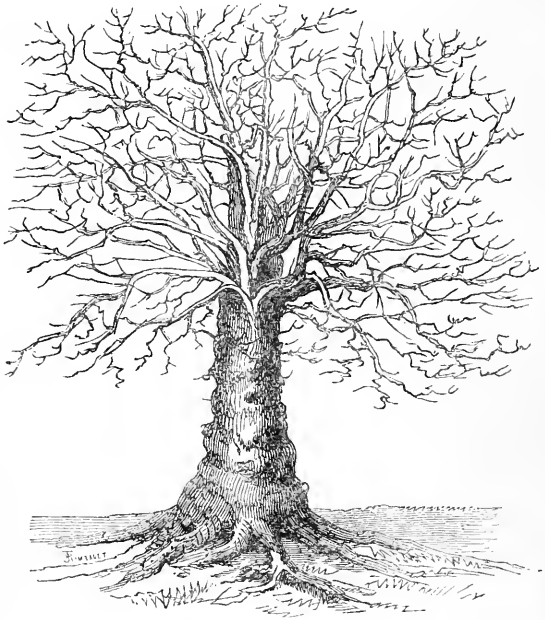

Fig. 4.—A Dartmoor Oak.

a keen-edged tool, cutting close to the stem, and smooth, so that the cut may heal over in a few weeks, the same spring.

The Ash-tree.

There are about 70 species and varieties of the Ash. It will be observed that some kinds never bear seed, while here and there it is found in abundance on some. This occurs on account of the tribe consisting of two

distinct varieties, namely, male and female plants—*i.e.* one plant bears the organs to produce the seed, and the other bears fruitless flowers. The common species (*Excelsior*) contains 16 or 17 varieties. These attain to a great altitude—as much as from 80 to 120 feet—if the soil and locality are suitable. The most favourable soil for growing large and sound Ash timber is one containing a deep, tender loam, free from rock and excess of stone, and, while retentive of moisture, not water-bound. I have known the Ash attain to a most surprising magnitude in such a soil, even when it has not been so high as the general level. I knew a whole wood of this kind of Ash, which acquired the name of "Ash Wood" on that account, and I have never seen such fine Ash timber, either before or since; and, moreover, it was sound when it was felled. The Ash will grow very rapidly in such soils.

The propagation of the Ash consists in raising it from seed as well as by grafting. The former plan is effected by gathering the seed as soon as it is ripe, and then burying it a foot deep in the ground, and nearly filling the trench, which may be 1 or 2 feet wide, with the seed masts. Then cover the seed up with earth, and let it remain till February, when it may be taken out and run through a coarse sieve to separate it. It may then be sown in drills 1 foot apart, in good tender, sandy soil, and transplanted from these drills at one or two years old. One year is time enough to plant the seedlings, when they are to be placed in a plantation for subsequent removal as stocks for grafting the pendulous or weeping varieties on. In this case plant the young seedlings on a deeply dug, good soil, in rows 1 foot by 6 inches asunder, with the hand-dibber; let the seedlings remain here for three or four years, when most of them will have attained a height sufficient for grafting on the weeping varieties. This is done at the top of the stock, at any height which may be thought most desirable, which should be 10 or 12 feet from the ground, as a rule. These stocks should be grafted before they are removed—two years previously at the least.

The grafting may be done by the common whip method; or if the stem is large enough, rind-grafting may be adopted. In all cases of grafting I think the grafting-wax is the best preservative against droughts. This is put on with a small painter's brush when half cold, or just thin enough to paint upon the tied-in graft. If ordinary grafting-clay is used it will dry and crack, and let in the air, when probably the operation will prove a failure. As soon as the graft has grown and made a shoot it should be cut back close, so as to induce as many shoots as possible to form close to the crown, and when these are considerable in number, and have made a foot or two of growth, tie a string to each leader and gently bend them down, and tie each string to the stem (Fig. 5). The Weeping Ash should be planted in deep and good ground if a luxuriant specimen is desired. It is useless to expect a fine and free-growing tree unless this is done; and the plant should be placed where it is to remain for life not later than three years from the time of grafting on the stock.

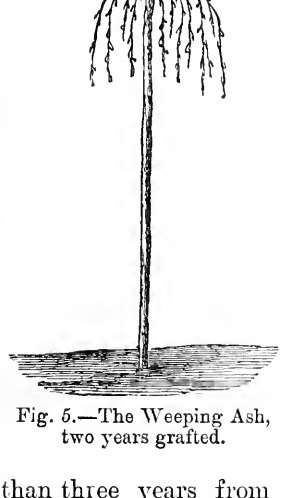

Fig. 5.—The Weeping Ash, two years grafted.

Soon after maturity the Ash begins to decay. This commences at the surface of the ground, or just below it, and the tree decays upwards. Whenever the woodpecker is found to have made a hole in the stem of an Ash-tree (which it frequently does), be sure that tree is worthless in the interior, notwithstanding it is, to all outward appearances, healthy and sound.

The timber is most useful for dry work, but useless for outdoor work, and soon decays if exposed to the

wet. It is also liable to the attacks of those wonderfully minute insects *Sirex Gigas* and *Sirex Juvancus*—the wood-borers. Of all insects these are no doubt the most wonderful. You observe your chairs or table full of pin-holes, and these holes increase in number; yet you can never discover what causes them. Well, these tiny little insects, not large enough to be seen, have done it all, and will ultimately destroy the article, so that one day it will drop to pieces in your hand. These insects do not wait until the wood is decayed, but attack articles as hard and as sound as bone, seeming almost to delight in their hardness. I have tried many times to find the wood-destroyer, but never could, although I have had some articles destroyed by it.

The Ash-tree seldom sends down a direct taproot, but is provided with some few indirect downward spurs, which descend with equal strength and support as a taproot. In fact, those who grub the bottoms up say these spurs are worse to get out than a breach with a taproot, because they are not so easily found. Besides some five or six of these deep spurs, the Ash is provided with numerous surface-roots of a large size, according to the age of the tree, which frequently run on the surface of the ground scarcely half buried. These roots may be frequently traced for several yards. They seem to go a long distance in search of nutriment, and will so impoverish land that no vegetation can survive except of the tree kind. For this reason the Ash must never be allowed to grow near tillage-land. I mention this particularly as a caution.

The Elm.

The Elm, like the Ash family, contains numerous species and varieties. The *Campestris* are the common varieties we usually see; the *Montana* and its varieties are seed-bearers, and are used for stocks for grafting the others on. Most Elms will grow from suckers, when they can be had; and this is often the case, as the Elm is free to produce suckers from the roots that

travel a long distance from the stem of the tree, a few inches under the surface of the ground. I have traced them for rods. These suckers may be taken up with a mattock and planted in rows or beds, and finally transplanted to the place where they are to remain for timber.

The seed should be gathered as soon as ripe, buried as recommended for the Ash, and sown in early spring in the same manner. The seedlings will be fit for grafting the second and third springs from the sowing. This should be done near the ground, except in the case of grafting the pendulous varieties, when the grafting must be done at the top of the stem, as for the "Weeping Ash."

The Elm will grow to a large size, and remain sound in a good deep soil, not too wet; but if the locality is low and supersaturated with stagnant water, the timber will begin to decay before it has arrived at half the size it is capable of attaining. It will soon begin to do this in the centre, at the root, if the land is too wet. The Elm never has a taproot, and seldom any very large downward spurs like the Oak or Ash. This is the cause of its early decay and of its easy capture by the winds.

When, however, the soil suits it, and the tree flourishes at a great size, such timber will generally be found to be sound, although extra large. This timber is liable to be attacked by the larva of the goat moth, which will eat its way into the heart and cause the decay of the tree.

The Beech.

The Beech is propagated by seed and by grafting. The common sorts are raised from seed, which is obtained in abundance. These nuts may be gathered as soon as ripe, and should be preserved moderately dry until March or April, when they should be sown in drills as for marrow peas, in a light sandy soil. If the ground is good, the seedlings will make satisfactory

growth, and be fit to transplant the second year. The fancy varieties are grafted on these as for the Elm. The Beech will flourish only in a dry sandy soil, where it will live and become a large tree. It will not decay in the timber when the soil suits it, but it is fearfully subject to the depredations of those destructive wood-borers the *Sirex Gigas* and *Sirex Juvancus*, notwithstanding its hardness when dry.

This wood is of great value for mechanical uses, but valueless for any purpose where exposure to wet is necessary. The Beech is of all deciduous trees the most useful from two or three points of view; first, it is well adapted for inner summer wind-breaks in any garden; secondly, it never distresses the land. Moreover, it is of a lively green, and it may be clipped to any compass; and being deciduous and of light growth, it shades but little during winter. The bronze and copper Beech are very uncommon, and are desirable dwarf trees among other shrubbery plants.

The Birch.

There are a great many varieties of the Birch, some of which are really handsome, especially the pendulous kinds. These are particularly so when they get old. I know of no forest trees comparable with fine old standards (*Alba Betula*) growing at the edge of a plantation so as to show themselves beyond the rest of the trees, or planted in large clumps of a dozen or so, with an Oak or two filling up the middle. If the land is moderately dry and good, the Birch will grow well, attain to a fair size, and live to a good old age; but, if not, it will decay before its time. The timber is comparatively worthless except for some dry mechanical purposes. The wood is of the finest grain, heavy, and durable, and is fit for some fine cabinet-work, being free from iron, oil, &c.

This wood is subject to the attacks of the *Sirex Gigas* and *Sirex Juvancus*, the wood-borers.

The Birch is propagated by seed and by grafting.

The seed must be gathered as soon as ripe, dried well, and preserved in paper bags till the spring, or it may be sown in the autumn. In either case the ground must be fine and light. The seed must be sown in very shallow drills, or over the whole surface of a fine bed, thickly; and some fine leaf-mould and sand strewn thinly over the whole so as to barely cover the seed, which is very fine. Or it may be sown in seed-pans and treated as the *Coniferæ* (see pages 18—20). The grafting

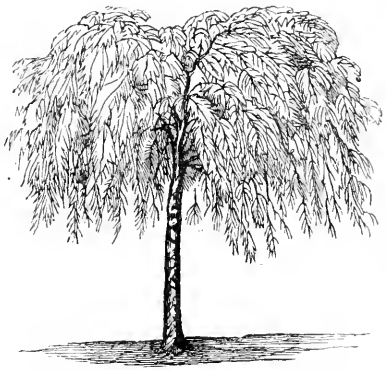

Fig. 6.—The Birch.

is done as for the Elm, &c. Sometimes suckers may be obtained, by which means the common Birch may be multiplied. The Birch will bear cutting in to any extent, but its beautiful character is only preserved by allowing it to grow unpruned.

The Lime-tree.

The Lime-tree is a small genus of very useful trees. It is capable of attaining to a very great size, which it may retain in good health. The Lime grows freely in a deep sandy loam. It will bear pruning to any extent; this qualifies it for almost any situation. It is a densely

foliaged tree, and bears racemes of sweet yellowish flowers, of which the honey-bee is remarkably fond. The timber is of no use except for dry work, but it is of a soft nature. There is no tree better, if so well, adapted for avenues and wide streets, for summer shade, as this. It is of a beautiful light green, very flexible in habit, and will bear the knife, as I have said before, so that it can be kept from encroaching beyond the desired limits.

The Lime is propagated by seed; but as it gives suckers freely at the root, if some earth is thrown around the trunk the suckers will strike root in it, when a number may be taken off every autumn, and planted out into beds or rows. As the young trees get up, care must be taken to keep the stems clear of offshoots, in order to obtain a clean neat stem.

The Chesnut.

There are two species of the Chesnut, each being totally different from the other, botanically. I will speak of *Æsculus* (Horse Chesnut) first. This species is a most noble park tree, especially the scarlet-flowered kind, but the timber is of no value except for firewood. It is soft and brittle, and when the tree gets large, it is very liable to be broken by the high winds. For this reason it is objectionable for parks; nevertheless it is a noble-looking tree. It is propagated by seed only. The nuts should be planted three or four inches deep during the autumn and winter months.

The other species of Chesnut, the *Castanea*, is not so beautiful as the former, but still it is a fine park tree, of great utility for its timber (which is as handsome as mahogany, and will take as fine a polish), as well as for its fruit, which is good eating as a nut. This timber will pay well to grow largely on account of its value. It is raised from seed. The nuts may be sown from the month of January until March, as in the case of the Horse Chesnut. The ground should be of a good light nature in which to sow them.

The Acacia (*Robinia*).

This Acacia belongs to the same natural order as Acacia proper, but differs in the construction of the organs of fructification. The Acacia proper belongs to the Linn. order *Polygamia;* which means plants possessing male and female flowers on the same plant separated; but the false Acacia, as it is called—the Robinia—belongs to the Linn. order *Diadelphia Decandria,* which class of plants possesses them complete, *i.e.* those having male and female organs in the same flowers; yet both of these species bear seed-pods alike, and have the same appearance as regards their foliage, the difference being merely in the flower.

The Acacia Robinia is as beautiful and hardy a tree as any we possess, regarded as a park tree. The foliage is pinnatifid and of a slender construction, being of a light green colour, and beautifully distributed over the whole plant. The character of the tree merits it a place in every well-devised park. The timber is of the choicest description, and surpasses even the rosewood for beauty of polish and markings in the grain. There is no wood which can equal the Acacia as regards excellence for choice cabinet-work, and it is almost as hard as ebony—therefore not soon affected by damp or heat, neither is it liable to the attacks of insects like some others.

They all bear handsome flowers of a white, yellow, or red colour. They may be raised from seed, which they produce freely. Some are propagated by cuttings of the half-ripened young wood, struck in sand and peat under a bell-glass, with a small amount of heat. The better kinds may be grafted, or budded on the common kind—the Pseudo-Acacia, which can be raised freely from seed.

As the seed is very hard, it is necessary to soak it for a few hours in tepid water previous to sowing, especially if the seed is saved in a hot climate.

The seed of the common Acacia may be sown in the open ground in fine sandy soil in a warm place, but it

is best to sow it in deep seed-pans and set the pans in a cold pit or frame, keeping the sashes close and the seed sprinkled daily until it comes up, when the seedlings may be put outside in a sheltered place until they are large enough to put out into the open ground. The young seedlings may then be pricked off into a bed of fine soil or into other seed-pans or pots, from which they may be transplanted to the spot where they are to remain. The Acacia flourishes well in a porous sandy soil, and will then grow to a good girth, but it will decay much earlier if the subsoil is wet. The grafting may be done either on the top of the stock or at the bottom, as for the Plum.

The Acacia proper.

This class of Acacias are all more or less tender, being only adapted for our conservatory ornamentation; and although as a class we seldom see any of them here (except the old favourite *A. Armata*), yet there is not a more beautiful class of foliaged shrubs to be found among all our plants. There are something like 180 species and varieties of this family, all more or less handsome, many being of extraordinary beauty, while some are very useful from a commercial point of view. The Gum Arabic commonly sold in our shops is the produce of *A. Arabica*, a native of the East Indies. The Gum Catechu is from *A. Catechu*, also a native of the East Indies. *A. Lophantha* is a beautiful conservatory tree, and is well adapted for window work, but *Armata* is admirably suited for the latter.

All the varieties may be propagated by seed, as well as by cuttings, which latter may be easily struck in sandy peat under a bell-glass in almost any place; but a small amount of bottom heat facilitates their striking. The cuttings must be of the same season's growth, half-ripened short stuff from the old wood: the base of the cutting must be made clean with a keen-edged pen-knife, or a budding-knife, and the leaves trimmed off half-way up with a pair of trimming-scissors. The

pots should be half filled with broken potsherds, and then filled up to the top with a fine sandy peat compost quite firm. The cuttings should be inserted an inch apart all over the pot, allowing sufficient space for the striking-glass to go over them and inside the rim of the pot. Settle the soil about the cuttings by watering them with a fine rose water-pot, and let them dry off a little; then put the glass on, and shade them from the hot sun with a sheet of paper. Wipe the bell-glass occasionally, when there seems too much damp condensed on the glass inside, and then put the glass on again immediately; a little water will be necessary at times before the cuttings have struck root, which is rather a slow process. As soon as they have rooted, which may be known by the growth they make, remove the glass, and pot the cuttings off a week or two afterwards, using small pots and the same kind of soil: nip out the top of each young plant; this will induce dwarf, bushy plants to be formed while they are young.

The raising of the Acacia from seeds is attended by many circumstances requiring attention. The seed is extremely hard, and must either be subjected to a strong moist heat, or be soaked in very warm water for twelve hours before sowing it, then covered a full half-inch with the soil, which must be sandy, and set on a brisk heat to vegetate. I put the seed in a mug, basin, or cup, and pour moderately hot water on it at night; let it stand, and sow the seed the following morning.

The Pine-tree and Fir-tree.

Our home-grown Pine is not so good as that imported; still it may be, and is, of great use in dry rough work. The common Scotch Pine is as good as any for general use, and will grow to a fair size in any situation. The Larch is one of the most useful of this class, and it is no doubt a good speculation for large landowners to plant it extensively on their waste lands.

There are thousands of acres of land that can scarcely be put to any tillage purposes, that will pay well for growing the Larch Fir; in fact, as well, all things considered, as an annual tillage of the land; for when we take the expenses into account, we find that these Larch-trees nett as much profit as other things. But leaving this out of the question, the Larch Fir will grow where the land will not pay for an annual tillage at all. This is my reason for recommending the planting of timber trees on all accounts.

All the Fir and Pine tribes may be propagated by seed, of which some of the more hardy and common sorts may be obtained from English-grown trees; but for some of the rarer sorts recourse must be had to foreign seed merchants, or those who import the cones. It is true most of them will bear cones in this country; but I find some perfect very few seeds, or next to none. The Scotch, the *Cembra*, the *Pinus Insignis*, the Spruce, and the Larch will perfect good seed here. This should be gathered as soon as ripe, and the cones kept dry till spring, when about March they may be laid in deep tin pans, or some such utensils, and set in the full focus of the sun under glass. In this situation the cones will open, and let the seed out, which must then be put into paper bags as it comes to hand, and sown in deep seed-pans in April, using a compost consisting of sandy maiden loam. In sowing the seed of the Fir tribes, and, in fact, all the *Coniferæ*, care must be taken not to cover it too deep. I once gave my young man half a pound of *Cupressus* seed to sow on a given spot in the open ground (for it may be sown in the open ground, provided the soil suits it, and the necessary care is taken afterwards in order to insure success), when he forgot my directions, and having sown it he raked it in an inch deep. Of course none of it came up.

The seed-pans should be filled firmly with the compost up to within half an inch, and made solid by shaking it down and knocking the pan on the bench, also by pressing the soil in with the ends of the fingers.

When made smooth on the surface, and the seed sown moderately thick over the whole place, with some of the fine-sifted compost sown over it, barely covering it, then set the seed-pans behind a north wall, or rather behind a south wall or hedge, which would be of course on the north side. It is not advisable that they should be exposed to the open north winds without some break, for in such a case the seed will vegetate reluctantly.

To be really successful in raising the seedlings of any of the *Coniferæ* (which means all the Pine, Fir, and *Cupressus* tribes), it is necessary to possess favourable circumstances with regard to the situation; partial shade, and shelter from harsh and drying winds. These are necessary for raising these tribes from seed, together with careful watching, to see that the surfaces of the pans or beds do not get perfectly dry. As at certain times of the year (April and May, for instance), drought may be expected to be severe, a daily sprinkling will be necessary to prevent the spearing of the seed being delayed; but care must be taken not to supersaturate or sodden the earth, or it will rot. The seed is also liable to the attacks of mice, to prevent which place some fine wire netting over the seed-pans.

The seedlings should remain in the pans two years, or at the least until the April following, when they may be transplanted from the pans to a bed or beds of fine sandy soil well prepared. In doing this choose showery weather, mark the surface of the bed across with a five-foot measure at 6 or 8 inches apart, then shake the seedlings out of the soil, or rather the soil out of the roots, and shorten the roots moderately. Then, as quickly as possible, before they dry too much, prick them out into the lines with a common dibber, at 4 to 6 inches asunder, and well water them afterwards. Here they may remain for one or two seasons, when they must be replanted at a greater distance apart, and soon, about every two or three years, a replanting will be necessary, until the plants are placed where they are to remain permanently.

How to plant Pines and Firs.—When any of the choice Pine, Fir, or *Cupressus* tribes are to be permanently planted, it is of the utmost importance to look forward as to what it will be twenty or thirty years hence. I have known some valuable trees obliged to be sacrificed to the woodman's axe entirely through misplanting, or planting the young tree where it had not sufficient room to develop itself. "Oh! what a pity," thought I, "that this fine tree, worth a hundred pounds, should be obliged to be cut down before it has half developed its grandeur, and all through the planter not looking forward and seeing how much room it would require to develop itself fully." I am quite aware of the difficulty there is in giving a good flowery finish to a gentleman's grounds around the mansion, when young stuff of 18 or 24 inches high is planted for a few succeeding years. For this reason (and one other, which is of more consideration to the nurseryman who supplies the stuff than the first reason), the Fir and Pine tribes especially are, in nine cases out of every ten, planted too thick, and without good judgment. In every case of making new plantations composed of *Coniferæ*, especially the Pine and Fir class, certain subjects should be made specialities throughout the whole plantation. These should be noted on the plan; others then may intervene as mere accessories, to be removed in due time, so as to give room for such specialities to develop themselves freely. This seems to be the chief point in plantation-making.

It is not good policy, in planting the *Coniferæ* tribes, to use large specimens on any account; generally, it is three-fourths so much ready money sunk, because two out of every three plants die—yea, three out of every four, or even more, unless they have been shifted every two or three seasons at the least. Then these trees can be warranted by the nurseryman; but if they have not been so removed they may look even more luxuriant, and the price may be an inducement to the purchaser; but they are sure to die if not planted by some most judicious and painstaking person, and even

then some of the *Coniferæ* will die at an advanced age and growth. I must here repeat my remarks relative to the planting of this class particularly, as I am convinced of the error most men fall into when planting trees and shrubs, chiefly about gentlemen's grounds, and more especially about the house and on lawns, &c. It frequently happens that, to make a newly planted tree of an ornamental description appear neat and a finish, the plant is put in the place, and the soil trodden in upon the roots as hard as it was before it was dug out for the reception of the plant. This is one of the greatest errors it is possible for a man to commit in planting, and is a sure means of destroying the tree, in nine cases out of ten, from the very fact that the fertilising influence of the sun and air is excluded from the roots; not only so, but the formation of the new and tender parts of the roots (which must be formed before the tree can succeed) cannot freely penetrate the soil so trodden in immediately upon them as hard as a beaten pathway. This is no doubt the chief cause why large trees of the evergreen class fail.

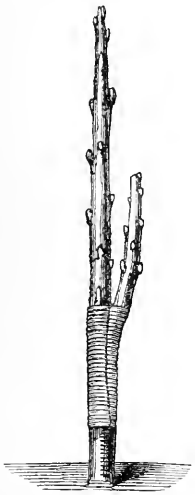

Fig. 7.—The Pine-tree whip-grafted.

Several weeks should elapse from the planting of a tree till the final filling up with all the soil upon the roots; and very little treading in of the soil upon the roots should be done at all, just enough to fix the tree steady, and allow the earth to settle down by the rains gradually for two or three weeks, then fill in finally. A large tree or shrub should be supported by three stakes as a preventive against the wind.

But I advise that young trees of the Pine, Fir, and Cupressus classes be planted in preference to medium-sized ones. Four or five years are quite enough as regards age.

PROPAGATION OF THE PINE AND FIR TRIBE BY GRAFTING.—The choice and rare sorts may be multiplied by grafting, using any of the common kinds for stocks. The grafting must be done close to the ground on small stocks in the early spring. Side-grafting is the method best adapted for these classes.

THE POPLAR.

There are a great many varieties of this genus; but the *P. Tremula*, or Aspen, is, perhaps, the most useful as timber. There is a very singular feature in connection with this Poplar in which I have felt particularly interested, in its differing from any other common tree. When it is in leaf, let there be ever so slight a motion in the air, when the leaves of all the other trees are perfectly motionless, those of this tree are still on the move in a singular way. This arises from the long footstalk of the leaf being attached to the middle of the broad-shouldered leaf, which, being large in proportion to the strength of the footstalk, is suspended in a similar way to a kite; and this peculiar construction gives the slightest breeze power enough to cause a vibration of the leaf from right to left and *vice versâ*. Looking at the tree from a distance, when there is (it may be said) no wind, it looks like a thing affected by some unnatural phenomenon. This Poplar is of very rapid growth, and soon forms timber; but this is of little use, except in the dry, for such purposes as for the rafters of houses, stables, granaries, &c.

There is a striking illustration of the peculiarly durable quality of the Poplar to be seen in a main beam in a church at Thaxted, in Essex. I was informed of it some years since, and it may possibly be there now (1880). Upon this beam, which is large and exposed to view, is written in bold type—

> "Let the heart of oak be ever so stout,
> Keep me dry and I'll see him out."

This, no doubt, may be true in fact, as even the heart of Oak is liable to be destroyed by the "wood-borers," like the Beech, Ash, &c., whereas the Poplar never is. A singular fact this, but why this is so I cannot properly account for, except that the wood of the Poplar is too soft and woolly for these wood-borers to cut into. Most probably, too, its being of a fine long grain fussels their cutter-up so that they cannot work pleasantly. But the Poplar is of no value for any work where it is exposed to wet.

The Poplars may be propagated by cuttings made of long, stout young wood, well ripened and dug in as for briar-rose cuttings, during the autumn of the year. The Poplars may also be multiplied by seed, and by suckers when they can be had. *P. Grandidentata* is the most noble, perhaps, of all, towering as it does up into the air for 100 feet.

The Holly.

There are a great many varieties of the Holly, and nearly all of them are natives of Great Britain. There is also one commonly called *Knee Holly*, which is not a Holly at all. The Holly belongs to the nat. order *Aquifoliaceæ*, while the Knee Holly, or *Ruscus Aculeatus*, belongs to the nat. order *Liliaceæ*, *i.e.* flowers resembling a diminutive lily, while the flowers of the former belong to a class quite different, Linn. class 4, and order 3, the latter having 6 stamens and 1 style.

Aquifoliaceæ conveys no idea of the class, but simply refers to the plant belonging to those with prickly leaves. This being the case, I am disposed to look upon the term "Aquifoliaceæ" as misleading, because there are some other genera possessing prickly leaves, and some Hollies that have leaves with no prickles; and in the case of the *Ruscus*, which has prickly leaves, it may be and is called a Holly, while it is of another genus.

The Hollies are a most splendid tribe of plants, and may be considered among our best hardy English foliaged evergreens, well adapted for every species of

ornamental planting. They live to a great age, and if the soil suits them (which should be as good as is required for Roses), they will amply repay for it in handsome foliage, with an abundance of it, with a free growth. This, however, is not often the case, for it seems that generally Hollies are planted where few things else will grow, and the consequence is poor, half-starved growth, with thin and poor foliage, which in a Holly is miserable. The common sort is a splendid dark evergreen when grown in good ground, but the silver and gold variegated sorts are superb plants, above the general conception when planted in good soil, and somewhat shaded. The *Crispum* and *Ferox* are very handsome and curious in their foliage, and worthy of a place in every select shrubbery border.

THE PROPAGATION OF THE HOLLY.—The common sorts are multiplied by seed. The berries must be gathered during the late autumn or winter, and either put in a heap to rot the flesh off the stones, or buried in the ground for the same purpose. The seed may be sown during the following spring in deep drills, or beds of light soil, covering it 3 inches. It is very slow in coming up; some may not appear till the second season. The seed should be shaded during the summer with furze or fir branches. When these common seedlings are two years old, they should be transplanted out into rows 9 inches asunder and 4 inches apart in the row. Here they may remain for one or two seasons, when any of the variegated sorts may be grafted on them close to the ground. In grafting them care must be taken to match the scion and stock. Tie the graft carefully on, and cover it well with grafting-clay or grafting-wax, which is better. They are slow in uniting, therefore do not untie them too soon—not before the autumn.

It is of no use sowing the seed of the variegated sorts with a view to get plants like them, for the seed of these will produce green Holly only. Cuttings of the choice sorts may be struck with care and long patience under a handlight, in a shady place. The cuttings

should be of the summer's growth. The soil must be moderately light and very sandy for this work, and free from too much water.

The Holly should by all means be planted where it is to remain for life while quite young. It is one of the most stubborn and fastidious things possible to remove when much advanced in growth, and seldom or never does well if removed when of middle size or above that. The transplanting of the Holly should be done early in the autumn, or not before April; and some additional pains are necessary for success when planting good-sized Hollies. Some fine sandy maiden loam should be used for the roots, and well worked among them. This soil is excellent for inducing a quick root.

The Thorn.

The uses of the White Thorn are well known, and the beauty of some of its varieties is equally deserving of notice as being very ornamental for park and lawn trees. There are numerous species and varieties of this interesting tribe, some having flowers as beautiful and as double as a rose. Nothing can surpass, if comparable to, *Cratægus, Oxyacantha multiplex,* with its beautiful double white flowers, and *C. punicea,* with its handsome scarlet flowers, and *C. rosea flore-pleno,* a splendid double pink-flowered variety. All the double varieties must be grafted on the common Thorn, which is raised from seed. The haws must be gathered as soon as ripe, and the pulp rotted off by laying them in a heap, or by burying them in a hole dug out in a dry spot out of doors, and then covering them up till the spring (about March). Then clean them, and sow the seed in deep drills drawn with a hoe, sowing it thick as for small early white peas, and covering it up with fine light sandy soil. These seedling quicks are used for making hedgerows, and may be planted at one, two, or more years old.

When they are wanted for stocks to graft on, they should be planted out young in good strong ground,

and encouraged to grow as fast as possible, so as to get healthy and straight stems. The grafting may be done near the ground, or at the top of the stock at an advanced age, as for the Apple or Pear. March or April is a good time to do this.

The wood of the Thorn, when come to maturity and thoroughly dry, is nearly as hard as bone, and is excellent for mallets, &c.

The Sycamore (*Acer pseudo-platanus*).

The Sycamore is a species of Maple, all of which are very ornamental-foliaged trees, but the common Sycamore is one of the most splendid ornamental park trees to be found. Now many persons no doubt will wonder at such praise being given to the common Sycamore, who may not have noticed the beauty of it as I have. This consists, not in the habit of the plant, but in the flowers and the seed, which consist of splendid long racemes suspended from the branches in abundance and in a most graceful manner. After these come the singular Samara-like bunches of seed, suspended in a very conspicuous manner from the long footstalk, and which continue for a long time.

The leaves of this tree are large and ample, affording a good screen from the heat. This tree should no doubt be planted freely in public gardens, for shade in streets, and along public walks, &c. It may be multiplied by seed freely. Gather the seed as soon as ripe, and lay it in a heap, or bury it for a short time to rot the husk off; then clean, and sow it in drills 2 inches deep, in some light, good ground. Plant the seedlings out the first or second year 1 foot by 6 inches asunder; replant them again after two seasons, in rows 3 feet by 2; here they may remain for specimen plants, to be planted where they are to be for life.

The Maples are a splendid class of forest trees, and are, moreover, very serviceable for the wood, which is used for fine cabinet-work, and has a beautiful light grain.

The Plane-tree.

The Plane-tree is a small class of very remarkable, fine park trees. Its foliage is of the noblest description; the leaves, which are not so thick in numbers as some, being very large and of a boldly-cut character. This tree is one most deserving of a place in parks and public places for its shade during the summer. It may be multiplied by seed, like the Sycamore, Maple, &c. It will also grow by cuttings of the last season's growth, cut off just where the shoot started, with a heel of the old wood, clean cut at right angles at the bottom of the cutting, and dug in, as in the case of the Laurel, in fine light soil three-fourths of the length of the cutting, treading the soil firmly on the lower part of it. If the weather should be a long and severe frost, or is likely to be, some means must be adopted to protect these cuttings, as the hard frosts will even kill old trees of the Plane kind. Some branches of Fir, or furze, or ferns may be used to cover them on such occasions, to be removed as soon as a thaw commences. The wood of the Plane is of little use except for firewood.

The Cedar.

The Cedar of *Lebanon* and the *Cedrus deodara* are the most conspicuous of all Cedars. These are too well known to require any description here; suffice it to say that both are worthy of a more extensive cultivation than they yet command. The *Deodar* is certainly the most beautiful to be found for park planting, and makes one of the most majestic and at the same time most graceful trees to be seen, while the *C. Lebanon* no doubt outvies every species and variety of evergreen tree to be found in the world. A well-grown specimen, 200 years old, throws every other forest tree into the shade for general magnificence of character, both in regard to its magnitude and colour. It is difficult to convey anything like an accurate idea of the imposing magnitude of such a thing to one who has never seen large trees.

There is a sort of solemn awe experienced on approaching a gigantic, sombre, and aged Cedar of Lebanon, with its table-like, carpeted, horizontal branches extending for yards from the main body. And in a well-grown old tree these broad table-like branches, one above the other, give a sombre appearance to it differing from anything else.

The Cedar of Lebanon is such a sturdy tree that we never hear of one being blown down or broken, although it carries as much foliage as most trees; but the wood is of so strong a nature, and the branches are so peculiarly united to the main stem, that, pull the limb which way you will, it is able equally to resist the strain.

The wood of the Cedar of Lebanon is equal to mahogany; yea, more durable, and equal to it in polish. I am quite surprised to see so few of them about the parks, &c.

The propagation of the Cedar is by seed got from the cones by splitting them with a chisel, extracting the seed, and sowing it in deep seed-pans during March and April, as for the Pines, Firs, &c., the subsequent treatment being precisely the same. Cuttings may be struck with care, and the *Cedrus deodara* may be grafted on the Larch Fir, close to the ground. The Red and White Cedars are splendid minor trees, propagated by seed sown in the same manner as for Pines, &c.

BOOK II.

ORNAMENTAL TREES OF LESS GROWTH.

The Arbutus, or Strawberry-tree.

The Strawberry-tree is an apt appellation for this shrub, for the fruit exactly resembles a strawberry, and it is also of an agreeable acid taste. This shrub is a most suitable subject for single specimens or for mixed shrubberies, but it should be planted where it can display its beauty, which consists in the peculiar feature of possessing flowers and ripe red fruit at one and the same time. The flowers are as much like Lily-of-the-Valley bells as anything, and are very good in bouquets for vases.

This shrub should be cut back frequently, as it is very liable to get barren below. It may be raised from seed, which should be washed out of the pulp, dried thoroughly, and sown in the month of February or March in deep seed-pans filled firmly with fine sandy peat and maiden loam. The pans should be well-drained, the compost pressed in up to within half an inch of the rim, made even, and the seed sown moderately thick over the surface, and then covered one quarter of an inch with finer-sifted soil of the same sort. The pans containing the seed should be set on a gentle bottom heat in a frame or pit until the plants appear. They should then be hardened off for a week and shifted into a cold pit or frame, and shaded from the strong heat of the sun for a month, when the pans

may be removed and set behind or under a north wall, or some shady spot for the summer. The seedlings may be pricked out into other pans or pots, or potted off singly into small pots in the following spring, and finally planted out into beds. The soil best suited for growing the Arbutus in is one of peat or good maiden loam. There are several varieties, but the *Unedo* is the best on account of the abundance of its berries.

The Yew.

The common and Irish Yews are great favourites. There is nothing, in my opinion, which has a better effect than a good many Irish Yew-trees about pleasure-grounds—their peculiar, compact, and upright character adapts them to every place, however small. Some of the Irish Yews, planted in suitable places, over lawns, on terraces, and in cemeteries or churchyards, and for the Italian garden, give them a somewhat marked character, differing in effect from those places which are destitute of them. The close, compact, pillar-like character, the deep green colour, and the lasting nature of the plant, render it quite an acquisition among the more delicate classes of shrubs. The Irish Yew will grow in any kind of good soil, and may be planted at almost any time of the year, except in the middle of summer.

There are several varieties of this tree. They may be propagated by cuttings of the ripened young wood under a handlight put in during the autumn. The common Yew is well known, and I know of no plant so thoroughly well suited for evergreen hedges, for interior fences, and screens about the house, &c., as the common Yew. It will live for ages, bear clipping as neat as a carpet, grows as close as a boarded fence, and is nearly as good, or perhaps quite, as a wall for a wind-break, while it is infinitely more agreeable in appearance. The Yew may be propagated by cuttings and by seed, the latter plan being the most general. The berries should be gathered as soon as ripe, washed clean

from the pulp, in the same way as for the *Arbutus*, and the seed sown in the ground or in seed-pans during the month of February, March, or April. Cover the seed one inch with fine soil, and keep it moderately moist. Many of the seeds may not vegetate till the following season. The after-treatment of the seedlings may be referred to the Holly, or any of the hardy seedling shrubs in planting out, &c.

The common Yew does not transplant well when large, unless it has been frequently shifted. It may be propagated by cuttings also, planted in a shady border. These cuttings must be firm, and nine or ten inches long, planted half-way in the soil.

The Willow.

There are a great number of species and varieties of the Willow, but I may only mention the Weeping Willows. The propagation of the species is nearly one and the same. Some of the more tender sorts will require to be struck in pots under glass, while the hardy ones merely require stout cuttings to be inserted in the open ground. The pendulous or weeping sorts must be grafted at the top, like the Weeping Ash, on stout stems of the common erect-growing variety—*Alba* or *Nigra*.

The American Weeping Willow is a most desirable tree if planted near a pond, canal, or stream. It is a very rapid grower, and quickly forms a handsome pendulous specimen. This and *Babylonica Napoleona* are the most suitable subjects to plant near the tombs of our departed friends, which trees always seem to say, "I mourn," and to participate in the grief of those left behind for the departed. The *Napoleona* is somewhat better suited for this purpose than the American, on account of its finer growth, *i.e.* it does not grow so rank.

When the Weeping Willow is to be planted on ground of a dry nature, as is frequently the case in burying-grounds, it will be necessary to provide in

some way to meet the case. In doing so, let the hole made to receive the plant be above the ordinary size, and 3 feet deep. Take the soil clean out, and put a foot layer of fine close sand at the bottom, treading it in well; this sand will retain moisture. Plant the tree in good earth, and a fine specimen will repay you for the trouble.

The Syringa (*Philadelphaceæ*).

The Mock Orange does not belong to the Lilac, which is mostly called *Syringa*. The *Syringa* proper is quite a different thing from the Lilac. This genus has *Philadelphaceæ* for its natural order, and belongs to the twelfth Linn. class—plants with many stamens—and the first Linn. order, one style; whereas the Lilac *Syringa* has the Olive for its type, *Oleaceæ*, and belongs to the second Linn. class—plants with two stamens and one style. This is very confounding, for if you send for a *Syringa* to a nurseryman, probably he might send you a Lilac, and they are two things quite different, both in character and in quality. The *Syringa*, or *Philadelphaceæ*, is as much like the Orange in the flower as anything can possibly be, both for character, colour, and fragrance. The *Syringa*, then—what I am now speaking about—is a hardy, free-flowering, fragrant shrub, which grows about 7 or 8 feet high, or perhaps less.

This shrub may be planted with others of the like character, but it should be so situated that it may develop its true character, which consists of a bushy style. It will flower down to the ground if kept cut back annually, just as you would prune a black currant, *i.e.* cut the overgrown stuff clean out and leave the young in. It is readily multiplied by suckers, and also by layers. The *Syringa* is a useful shrub for forcing, for imitation orange-blossoms.

The Guelder Rose (*Viburnum*).

Viburnum opulus is the Guelder Rose, which has, however, nothing to do with the Rose. *Viburnum* is

the genus, Guelder Rose is the species. The *Laurestine* is a *Viburnum*. The Guelder Rose is a valuable and a most singular plant when in flower. A few good plants of this kind have a very marked and striking effect among others in the spring, when in flower, with their large and pure white perfect balls of flowers, suspended as they are from the points of the branches in a most fantastic way; and being very large, they show themselves from a distance.

It may be propagated by seed and by cuttings. The seed should be sown as soon as ripe, or in the spring, in fine light soil. The cuttings should be put in in the autumn.

The Portugal Laurel.

The Portugal Laurel is a very useful shrub if planted in conspicuous places, where it can grow free from obstruction and has the benefit of good light all round. It should be cut over with the knife (never use shears) annually. It forms a beautiful, compact, evergreen ornament, if grown quickly for a few years and trimmed up with a leader to 8 or 10 feet, then stopped to form a head, and this head cut over with the knife annually, so as to form an umbrella-shaped head, with a clean, straight stem, and ultimately grown in a large pot or tub. It then answers well for imitation Orange-trees for the terrace, Italian garden, or for setting beside broad walks, entrances, &c. Planted as hedge-breaks for interiors, and kept cut in with the knife annually, it forms one of the most desirable screens in connection with pleasure-grounds that it is possible to have, and far superior to the common Laurel, as it never under such circumstances gets leafless and unsightly below, as is invariably the case with the common Laurel.

It may be easily propagated by cuttings, and raised from seed. The cuttings should be 10 or 11 inches long, of the same season's growth, taken off in the month of September or October, with a heel of the old wood; then cut at right angles through where the

young wood started from, quite smooth, and dig in with the spade in the following manner :—Dig a double row of spits, make fine and firm, then cut a slightly sloping trench with the spade across, say, a four-foot bed, deep enough to admit of the cuttings being half-way in the ground when finished. Now set them in, 3 or 4 inches apart, against the bank, and dig a spit of fine earth on to the cuttings, then tread it firmly on the lower part of them, and proceed so as to have the rows of cuttings 9 inches asunder from row to row. It may be necessary to top the cuttings as they are made. They will be fit to remove from the bed in which they are struck in the second season, spring or autumn, when they should be bedded out further apart.

The Portugal Laurel may be raised from seed sown in drills in a light sandy soil 3 inches deep. It may also be propagated by layers. To do this conveniently, old plants should be cut down close to the ground a year or two beforehand, so as to get a good supply of suitable stuff. The layering consists in bending a branch down, and burying one-third of the middle part of it in the ground, first cutting a tongue on the under side of each segment of the branch; and when these are brought upright at the points, the tongues will spring out, from which roots are emitted—(see Fig. 8.)

The Common Laurel.

Scientifically the Bay is called *Laurus*, or Laurel—which, however, has nothing to do with it. The Bay is called *Laurus nobilis*, and has *Lauracece* for its natural order, while the common Laurel has *Drupacece* for its natural order, and belongs to the Cherries. So that the common Laurel is really an evergreen cherry—*Cerasus* or *Lauro-cerasus*, or common Laurel Cherry. This is confounding, scientifically speaking.

The common Laurel is too well known to require any description; suffice it to say that it may be propagated by layers, as for the Portugal Laurel, and also by seed and cuttings. To prevent the Laurel from running to

the extremities, as it is sure to do, use the knife annually, and cut it back frequently. When it gets barren below cut it clean down, or layer it; these layers will grow, and fill up below speedily.

The Bay.

The Bay-tree is a most useful and beautiful evergreen shrub, suitable for all classes of screen and shrubbery ornamentation. It is not, like the common Laurel, apt to get out of order, but maintains a feathery state of foliage at all ages down to the ground. It grows thick, and consequently is admirably adapted for screens in all kinds of places that are disagreeable to the eye; and as it gives out a lovely fragrance to the touch, it is a most desirable shrub to plant in order to hide water-closets, ash-pits, &c., or to form an inner hedge as a break in all kinds of places. It will bear a moderately rough usage, and the knife may be used freely.

It may be propagated by seed freely, and by layers of the last season's growth. The seeds should be gathered in the late autumn, when they are black, and sown at once in drills 3 inches deep, in a light sandy soil. The seedlings will all appear in the following spring, and may remain two years in the seed-bed, after which they should be transplanted in beds or rows 1 foot by 1 foot 6 inches asunder, where they may stay until planted where they are to finally remain.

The Laurestine (*Viburnum Tinus*).

Viburnum is the genus, *Tinus* the species. It has many varieties, all of which are well known to be the most beautiful flowering evergreen shrubs we possess of a hardy constitution.

The propagation of this shrub is of the easiest description. It may be multiplied by cuttings, by layers, and by seed; by cuttings of the last year's growth, ripened in the autumn under a handlight in a shady

border; by layers as for the Laurel, trimming off the small spray and leaves from the branches buried in the soil, and scraping with the knife all the shoots, at a joint above on the upper side, which are suitable to

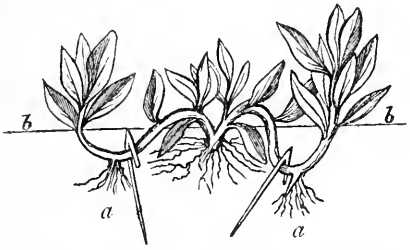

Fig. 8.—Laurel or Bay layered, showing the emission of the roots from the tongue, *a a*; *b b*, ground line.

make plants. This scraping of the bark is equal to cutting a tongue; it checks the run of sap, and induces the layer to emit roots below.

The seed should be sown as soon as ripe, or it may be preserved in sand till February, when it should be sown in drills 2 inches deep, in a moderately light sandy soil, in a little shade. Most of the seed will vegetate the same season. Let the seedlings remain in the seed-bed two seasons, after which they may be bedded out. Young plants of the Laurestine kind should be planted where they are to remain.

The Escallonia.

There are many varieties of this, but I shall merely refer to one, *Macrantha*, this being the most popular and the best. This shrub is no doubt one of the most superb hardy plants we possess; I know of no equal to it in the West, where it flowers the greater part of the year. It does this so profusely that it is a mass of crimson scarlet, and luxuriates to perfection.

This plant is a most accommodating one. It may be grown in a pot, and is superior to any Fuchsia: it may

be trained on a fence as a subdivision fence, where it will far excel the Rose in the richness of its dark-green foliage, which is of great substance, and also in its rich flowers: it may be trained on a wall to any reasonable height, while it makes a superb dwarf bush by cutting in; and it will flower abundantly in each of these situations.

The Escallonia will grow freely in almost any kind of good garden soil, but the drainage must be good. In some soils it might be advisable to introduce a large proportion of peat and leaf-mould, but I see it luxuriate to perfection about Torquay, Devon, in any kind of soil, which is frequently not much else besides loamy rocks, or stone and loam. In all probability this shrub would require a sheltered situation to preserve it during severe frosts. Here at Torquay we have the old Globe Fuchsia, and even some of our original greenhouse varieties, comparatively small trees, and the broad and narrow-leaved Myrtles in large standard shrubs, which are never injured by frost. This proves what the climate is, but I cannot say what the constitution of the *Escallonia* is, having never seen it in the northern counties.

It may be propagated by cuttings of the half-ripened last growth, stuck in pots of fine peat and maiden loam of equal parts, and covered with a handlight. A slight bottom heat will be necessary in cold counties. It may also be multiplied by layers and suckers.

The Magnolia (*Magnoliaceæ*).

The *Magnolia exoniensis* may be taken as a type of this magnificent genus. In the northern counties Magnolias can only be seen on warm walls, or walls facing the south, but in the western counties they may be seen as standards in fine flower, as also in the Western States of America. All the Magnolias are noble subjects when in flower. The *M. exoniensis* is one of the grandest flowering evergreen shrubs we possess. I am much at a loss to know how it is that so few plants of this grand variety are to be found, suited

as it is to any house wall. I would decidedly recommend it to all parties to plant on the south side of the house, and to train it on the wall quite thick, where it will present a most pleasing appearance, both in its large Laurel-like leaves and in its fragrant and noble cup-shaped pure white flowers, which are as large as a cup.

In planting this, it is necessary to make a careful preparation if the soil is not naturally of a sandy peat or good sandy loam. A large hole should be dug out and then filled in with peat—not bog earth, unless it has been exposed to the influence of the dry air for twelve months; or, the hole may be filled with sandy maiden loam and decayed leaf-mould and some pit-sand well mixed. In either of these the Magnolia will flourish.

The propagation is by cuttings of the last year's growth, taken off so as to secure a heel of the old wood. These should be taken off in the early autumn, as soon as the season's growth is ripened—the end of September or October—and inserted in large pots, 7 or 8-inch, filled with fine sandy peat, giving a good drainage. Put six or nine cuttings in each pot; let them be put into the pot half-way, close the soil well, and water them, and set the pots in a mild bottom heat. They are slow in emitting roots. The Magnolia may be raised from seed sown in a brisk heat, and it may also be grafted and had by layers. But as the cuttings may be had freely and will strike surely, that is all that is necessary for the propagation of the Magnolias.

The Tamarisk.

These are all very peculiar shrubs, on account of their finely-cut foliage, which gives them a great contrast to most others. Under careful management the *Tamarisk* will present a very beautiful character, but if left to chance it soon gets quite disagreeable in figure, for it grows very fast, and soon becomes ugly, and even an eyesore among other good shrubs. It forms a very

pretty standard if the long branches are kept constantly cut back, so as to keep the head short and compact. This is really the only way to preserve the Tamarisk in good health, for if it is left to itself it grows and dies and dies and grows in succession; that is, the branches do so. It may be multiplied by cuttings.

The Mountain Ash (*Pyrus Sorbus*, or Service-tree).

This is called "Ash" merely on account of its resembling the Ash in its leaf and the colour of the wood, for it has nothing to do with the Ash tribe as a genus. The Mountain Ash is very common in English woods and forests. It is remarkably pretty in the autumn of the year, with its bunches of vermilion berries. The tribe, especially this variety, may be multiplied by seed freely. Gather the seed as soon as ripe, and rot the flesh off by laying the berries in a heap; clean the seed out by washing, dry it, and sow in the early spring, in drills 2 inches deep, in good light soil. The seedlings may be used for grafting stocks for the more choice sorts, and for grafting Pears on. Many of the *Sorbus* kind are fine fruit-bearing subjects, and the fruit is very pleasant.

The Alder.

The Alder is a useful wood for converting into handles of tools, brooms, brushes, and various other articles of the domestic kind. The wood is of a peculiar light, soft, and fine-grained class, but of no use for any purpose where it has to be exposed to the wet for long. The Alder is a good shrub for its leaf, but only fit for outer plantations and for coppices. It may be multiplied by seed, sown as in the case of the Ash, Elm, &c.

The Judas-tree.

The *Cercis siliquastrum*, or Judas-tree, is a curious and beautiful small tree, producing its flowers before

the leaves. The flowers seem to come out of the solid wood, and are of a pea shape and of a red colour. Tradition says that this is the tree Judas hung himself on (?). It may be so, as the tree comes from that quarter of the world; and probably, being of an ornamental kind, it was planted around Jerusalem. The tree is certainly an ornamental one for outer plantations. It may be propagated by seed, sown in deep seed-pans of fine maiden soil and peat, and set in a mild heat in the spring. It should be hardened off as soon as it is well up, and finally planted out into good and fine earth. The rarer sorts may be grafted.

The Sumach.

The Sumach is an ornamental and large-growing shrub. *S. cotinus* is a very beautiful-foliaged plant. If it is grown rapidly (which it will do fast enough if in good soil), and trained up with a clean straight stem to about 8 or 10 feet, and then stopped, it will form a head which, when well grown for a season or two, and in leaf, will present a very noble appearance on the lawn as an isolated object. It is rarely that we see the Sumach to advantage.

The propagation of this species is by seed sown in deep seed-pans of fine soil, or by suckers and layers. The roots will form plants if made into cuttings, and every bit of root will make a plant if dibbed into the ground in the early spring.

The Laburnum.

There are many varieties of the Laburnum, but none more deserving of notice than the common Scotch. The common Laburnum is one of the most beautiful trees we possess of itself, and is too well known to need any description here. But there is one thing deserving of especial notice in this genus which we seldom or never see, and that is, the common Laburnum serves for stocks on which many varieties of the *Cytisus* may be

grafted, in a most useful and novel manner, as ornaments for our lawns, a thing but little done or seen.

The common yellow and white Spanish Broom may be easily grafted on the Laburnum at a height of 4 or 5 feet from the ground, which has a very splendid effect as single specimens on well-kept lawns; and the *Genistas* may also be grafted on the Laburnum with a good effect as low lawn trees. A variety of these, displaying their various colours in the form of small pendulous trees, judiciously planted over a good lawn, would produce an effect not common nor easy to improve upon by any substitute, and as lasting as can possibly be desired; for if well done and the soil is good, these trees will continue to do well for many years. Occasionally the heads will require a little thinning out and the dead wood cut out.

The tribes of *Cytisus* and *Brooms* (*Genistas*) may all be propagated by seed and cuttings. The double *Genistas* are propagated by cuttings and grafting. The cuttings may be struck under handlights during summer, and some in pots.

Genista canariensis is a beautiful greenhouse variety. Cuttings of it may be struck freely in pots, covered with a bell-glass.

Genista tinctoria flore-pleno is a beautiful hardy trailing shrub of compact growth, and well suited for rockwork. Cuttings of it may be easily struck under a handlight, put in during the early autumn or spring. The last season's growth, taken off at the joint where it started from, are the sort of cuttings best adapted to insure success.

By Seed the Laburnum and Spanish Brooms may be raised readily. Sow the seed in March or April, in drills 8 or 10 inches asunder, in light and good soil; the drills to be 2 inches deep, drawn with a half-moon hoe, and the seed covered as for peas. Plant out the seedlings into rows 1 foot apart and 18 inches from row to row. The seedling Laburnums will require straight stout sticks to tie the stems to for a year or two after the second season, and until the stems are stout

enough to bear the head, or they will grow very crooked and ugly. If the Laburnums have made good progress, they will be fit for grafting the Brooms on the third and fourth year. The grafting is done at the top of the stock, as for the Weeping Ash.

The Pyrus Japonica.

The *Pyrus Japonica* is a very uncommon plant, notwithstanding its remarkable beauty, which, when in flower in the early spring, is very striking, the whole plant being covered with large scarlet flowers, which appear before the leaves. There are several sorts of it, and the Quince is one of the genus. The *P. Japonica* may be grafted on standard stocks of the Quince at 5 or 6 feet from the ground, when it makes a beautiful lawn tree, and being very hardy and early in flower, it is very desirable to enliven the scene after a dull and dreary winter.

The grafting is done in the same way as the Pear or Apple is grafted in the spring. It may also be multiplied by layers of the last year's growth, as the Grape-vine is layered. These are slower to emit roots than the Vine, and must not be disturbed for twelve months from the layering, when the rooted layers may be removed and planted out, being cut in a bit to induce dwarf plants for walls, for which they are often used, as well as for low interior fences. The effect of this plant, trained on such a fence, is extraordinary when in flower in the early spring.

The Garrya Elliptica.

This and the remainder of the small genus are *Monœcious* plants, and belong to the Nut class. The *Garrya* is the type of the order, *G. Elliptica*. It is one of the most beautiful hardy evergreen shrubs to be found, possessing leathery, oak-like leaves. The flowers, to be sure, are not gaudy, but of a singular quiet colour and of a most distinct character, being doubtless incom-

parable as regards their exquisite form, being very long catkins of a lovely formation, which, when fully out (which is during the early spring) and seen hanging on a moderate-sized plant, are truly well deserving the title of "graceful," if such a term can be applied to a plant.

It should be planted on a lawn in single specimens, where it can be seen to advantage. It may be propagated by grafting on the Oak close to the ground, also by layers, and by cuttings in fine sandy soil under a handlight. The cuttings should be of the last year's growth, half ripened, and inserted in sandy soil in the open ground and shady; but the quickest and surest way to get plants of it is by grafting.

The Photinia (*Pomaceæ*).

The *Photinia* belongs to the Appleworts, although in natural appearance it looks like a Laurel and is an evergreen. It is a noble-charactered plant in regard to its foliage, but rather a thin-growing subject, having no particularly desirable feature as a shrub, except for its glossy leaves, which are of a dark green, inclining to a red in the autumn. It may be grafted or budded on the White Thorn or Crab stocks close to the ground in the spring, and budded in September.

The Figwort (*Buddlea*).

The old *B. globosa* is the only one well known of this small genus as a hardy shrub. Some of the tribe may be found in our greenhouses. They are very distinct in their flowers. The one here named has perfectly round flowers; hence its name, *Globosa*. They are of a rich yellow or orange colour, and are produced in abundance on plants grown on a dry soil.

The propagation of this species is by cuttings and by seed. Cuttings of the half-ripened wood may be easily struck in pots of sandy fine peat under a bell-glass. The seed should be sown in seed-pans in the spring and set on a gentle heat.

The Leycesteria (*Caprifoliaceæ*).

L. Formosa is nearly an evergreen in a warm climate. It is of a beautiful pendulous form, well clothed with foliage, and bearing an abundance of flowers and fruit. The fruit is similar to the berries the common Honeysuckle bears in regard to size, only the *Leycesteria* berries are black when ripe, and the Honeysuckle berries are red; the flavour of both is the same. Birds are very fond of them, and for this reason the Leycesteria is planted in game covers. It may be propagated by seed freely, sown in the spring in a fine light soil, and by cuttings put into pots or under handlights.

The Sunrose (*Helianthemum*).

The *Cistus* and the Sunrose vary so little in their generic relation, and are so much alike in their characteristics generally, that they may be fairly classed together here. Few or none could distinguish the difference between a Gum Cistus (as the Sunrose is technically called) and a Cistus. They are a most splendid class of plants. The division above, the *Helianthemum*, is a remarkably beautiful and useful tribe for covering rockwork, banks, and beds. Many of them will excel in beauty the bedding Verbena, and will flourish where the Verbena will starve and die away. They possess a variety of colours—white, yellow, pink, copper, red, &c., and many of them are as double as a Rose.

All of them may be propagated by seed sown in seed-pans in the spring, using fine peat and maiden loam, and set in a cold frame; and by cuttings of the half-ripened young wood during the summer months—short and firm young wood, taken off without any flower-buds, and carefully inserted in pots filled with fine peat, and set in a shady spot with a handlight over them. Water the cuttings to settle the soil about them, but be careful not to use too much water afterwards. Keep the cuttings at a moderate state of moisture, and as

soon as they are struck, which they will soon do, lift the handlight up to give them air; stop them, and finally pot them off or prick them out into a shady fine border, and again plant them out in a dry and sunny border or bed.

In the cold northern counties it will be necessary to house the young plants in a dry cold frame in the severe and protracted frosts of winter, and to screen old plants with furze-branches; but in the western counties no such protection will be required.

By Seed they are easily raised.

The Lilac (*Nat. Ord., Oleaceæ*).

I have said enough in reference to the Lilac not being a *Syringa*, although the genus is called one. Under the head "*Syringa*" is my explanation. The Lilacs are a most beautiful class of flowering deciduous shrubs, and are too well known to require any description here. They may be propagated by seed sown in the spring, in drills of light soil, a little shady.

The Lilac may be multiplied by the suckers, which it gives in abundance, and also by layers. It is a genus that is most desirable in back borders, and will bear cutting to any amount. It is useful for forcing, especially the Persian, and more particularly the White Persian. It may be taken up from the ground with a good ball of earth carefully, and potted in October, when, introduced into the heat in December, it will succeed well.

The Gleditschia (*Fabaceæ*).

This is the genus to which the Honey Locust-tree belongs, and which in all probability is the plant which composed the crown of thorns which the Jews placed upon our Saviour's head. It is a spiny variety; in fact they are a horribly thorny tribe, and the greater part of them come from Asia. The fruit was the locust food which John the Baptist eat, as it was plentiful

about Judea. Being a horrid thorny class, no doubt one of these was the tribe from which came the crown of thorns, instead of from *Paliurus*, which tribe is a dwarf class of very handsome shrubs, although spiny. The other, *Gleditschia*, grows to a common coarse tree, similar to the *Acacia Robinia*, and produces pods of bean-shaped seed. *G. Ferox* possesses thorns 5 or 6 inches long.

It bears seed as does the *Robinia*, and the species may be propagated by raising it from seed sown in deep seed-pans or pots, after soaking it for some hours in warm water. Sow in any good soil of a sandy kind, cover the seed an inch deep, and set in a brisk heat; pot off as soon as a few inches high, and plant out finally; or, the plants may be hardened off and pricked out from the seed-pot into a bed of fine good soil. The choice kinds must be grafted on the common sorts.

BOOK III.

SHRUBS OF AN ORNAMENTAL CHARACTER AND DWARF GROWTH.

The Euónymus.

The *Euonymus*, or Spindle-tree, can scarcely be called a tree, as it seldom attains to 6 feet in height. There are many varieties of this beautiful tribe. The gold-striped and the silver-leaved are among the most unique evergreen shrubs we possess. All the *Euonymus* kind are remarkably well suited for inner fence-breaks, or interior subdivision low fences, for nurseries as well as in the parterre, where neatness combined with beauty is a matter of importance. Nothing can excel and few things can compare with these for low, close fences, as subdivisions, if well planted, grown freely, and carefully cut in, or the points of the shoots nipped out as they grow.

As single specimens, the *Euonymus* cannot be equalled when well grown, as isolated subjects on a neat lawn, or in groups of three forming a compact clump. They are also well suited for low edgings round large beds of bulbous plants, especially the gold and silver leaf kind, which are as handsome as any flower, and much more lasting, as they always remain the same.

The propagation of these is easy enough. In the early autumn months, about October, select some cuttings of the last season's growth, 3 or 4 inches in length, trim the leaves off the lower half of the cutting, and,

with a keen-edged knife, cut it at right angles just below a leaflet. When enough are made to fill a hand-light, place them under it, in a nicely-prepared compost of maiden loam, peat, and sand, made fine. Insert the cuttings, 2 inches asunder, all over the space covered by the light, let them into the ground full half-way, and close the soil well to the lower part of the cuttings with a small dibber, which should not exceed in size a large school cane. When all are in, water them well with a moderately fine rose water-pot to settle the soil to the cuttings, and cover them with the light. By the spring they will have made sufficient root to allow of their being taken up and potted into smaller pots, or planted out into fine soil in a shady border 6 inches by 4 apart.

Should not the cuttings all have struck root by the spring, they must remain until the following autumn, lifting the handlight off as soon as they begin to grow. The *Euonymus* is a remarkably fine pot shrub, and will safely bear a good deal of drought and exposure.

The Berberis.

There are two classes of this genus, the evergreen and the deciduous. This last division consists of the common coarse-growing thorny Berberry, from which a small acid fruit is gathered for preserving. All the berberries are most desirable plants. The evergreen species are among our choicest ornaments of the garden. *Darwinii* and *Dulcis* are the most splendid-flowering evergreen shrubs we possess for planting on lawns, being covered in the spring with golden bells. They should have a conspicuous place assigned them. Nothing among low-growing shrubs can excel a well-grown specimen of *Darwinii* on a nice lawn.

They will bear cutting in well, but it should be done with the knife and not with the shears. The cutting or trimming should be done immediately after the flowering is over. Some of them, as *Empetrifolia* and *Repens*, are good rock plants, being prostrate-growing

sorts. All the species may be propagated by seed sown in the month of March or April, in drills 3 inches deep, in good light sandy soil, and somewhat shaded. They should be kept moist until up, but not supersaturated with water. Cuttings of the last season's growth taken off with a heel of the old wood will strike freely if inserted under a handlight during the month of September in a shady border, and in a fine compost of peat and maiden soil. Cut them at right angles just below the base of the young wood with a keen trimming-knife, and trim the leaves off half-way up the cutting, and insert them 2 inches apart up to the leaves; water to settle the soil about them. Let them dry off a little, and cover them with a glass. Suckers may be often obtained from most of the sorts, and they may also be multiplied by layers.

The Furze (*Ulex*) (*Fabaceæ*).

The double-blossom Furze is a very beautiful shrub for a lawn, as an isolated object; but when it is planted in conjunction with anything else, it loses its beauty as a shrub, and soon becomes a thing in common with confused border shrubs, and even gets ugly. It should be allowed a clear open space on the lawn, and carefully cut in with the knife, or, what is better, the pruning-shears, so as to keep its symmetrical character, which is a dwarf compact bush. If the Furze, whether single or double, is left to itself, it will soon get beyond what is ornamental or desirable.

The double-flowered kind is only propagated by cuttings, and must be done with the short growth of the last season, and one-half the cutting divested of its leaves, or rather spines; the base of it being cut smooth with a keen-edged knife, and inserted in fine-sifted peat and maiden soil of equal parts, with a portion of silver sand, under a handlight. This should be done in the month of October or in the spring, in a shady spot, and one not liable to too much wet, *i.e.* where there is stagnant water, nor under drips of trees or build-

ings. The single Furze is easily obtained from seed sown in shallow drills in March.

If two rows of Furze are sown 18 inches apart, they make one of the most enduring and close fences that can be had, especially for gardens that require shelter from cold winds; but it must never be forgotten that it requires the pruning-shears every season to keep it well feathered below, and then nothing will go through it.

The Althæa (*Malvaceæ*).

All the species and varieties of this order are more or less beautiful, and even the weeds of this class partake of its beauty. It consists of three divisions, the *Hibiscus*, the *Hollyhock*, and the Mallow, with their several varieties; and although all three of these divisions belong to the one great natural order *Malvaceæ*, yet few would observe this in the case of some of the subjects; for instance, the old *Althæa frutex* would be easily taken for quite a different thing from the Hollyhock, the Mallow, Hibiscus, &c. Here I shall only refer to the Hibiscus class, the *Althæa frutex*. These are deciduous shrubs of great beauty, comparable to carnations on trees. There is nothing to be compared with a well-grown dwarf standard Hibiscus on a lawn, or a small bed of them, consisting of numerous shades, as they are so remarkably varied and rich in colour. To grow them well a good compost of peat, maiden loam, and decayed manure is required, with a good free drainage. In the northern counties a difficulty will arise as to the flowering of many of the choice kinds; but in the southern and western counties no such difficulty will be felt. These are seldom or never seen nowadays, not because they are surpassed in beauty by any of our new things, but because they are not really known.

They may be propagated by seed from the single sorts, and by cuttings of the double ones, also by grafting on stocks of the common *Syriacus*. The cut-

tings must be ripened shoots of the last season's growth, taken off with a heel of the old wood. Cut immediately below the base of the young wood—a clean cut—and insert the cuttings in pots of sandy peat, and set them on a gentle heat in a pit or propagating-house, and place over them a handlight or a bell-glass that will cover say three pots. The seed must be sown in the spring, and set on heat until up, then hardened off, and finally potted for the tender sorts, and planted out if of the hardy kinds, such as *Syriacus*.

The Azalea.

It is almost superfluous to offer any descriptive remarks about the Azalea beyond that the American varieties are available for any of our gardens, and may be easily grown in good rough maiden loam, leaf-mould, and pit sand in equal parts, when peat cannot be obtained. Many people dispense with these beautiful lawn shrubs because they think they must have peat to grow them in; and peat cannot be had at all times. But the above compost will be found a good substitute, and it is generally obtainable on the spot. Gather all the leaves in the autumn, and deposit them in a heap somewhere where they may remain for twelve months or two years, turning the heap once or twice to hasten decay. At the end of the time it will have become thoroughly decomposed and fit for the purpose. The maiden loam may be fresh dug from a common or field, turf and all, chopped up, and used when wanted. The sand may be obtained from sand-pits.

If the natural soil is not good, nor fit for the Azalea, dig the bed out that is to receive the plants, 18 inches deep, carry it away, and fill in with the above compost; plant therein, and success will follow in the way of good bloom and healthy plants.

The propagation of the Azalea is by seed, by layers, and by cuttings. If by cuttings, select the last season's young wood 2 or 3 inches long: abundance of this is found on the plants as laterals. Take these off when

half ripe, with a heel of the old wood, or at least let a good base of last season's growth be attached to the cutting. Take off as many as will fill a handlight or a pot, as the case may be. This should be done at the end of August or the beginning of September. Trim the leaves off full half-way up the cutting, cut the base of it clean at right angles with a keen-edged trimmer or budding-knife. Cut immediately at the base of the growth, and insert the cuttings in pots, firmly filled with fine sandy peat up to the brim, quite level and firm, placing them 1 inch asunder, and up to the leaves, then close the soil well to the base of the cuttings, using a small stick dibber about the size of a cane. Water them well to settle the soil to the whole, and set the pots on a very mild bottom heat in the propagating-house, pit, tank, or tan-bed, covering the pots with a large bell-glass or handlight.

They will then strike root within two months or ten weeks, when air must be given, and finally the light removed altogether, leaving the struck cuttings in the same place for a month, when they may be potted off, and continued in a warm pit or house if of the Indian kinds, and in a cold frame if of the American or Ghent varieties, until the spring, when the hardy sorts may be planted out into beds of peat, and the Indian sorts repotted into 5-inch pots, and stopped to induce a bushy habit.

By Seed.—Sow the seed, which is very small, on the surface of seed-pans filled with fine sandy peat, and barely covering it; set the pans on a mild heat, and lay a flat square of glass on the pan, placing a sheet of paper on the glass to break off the strong sunlight until the seed comes up. When it requires watering, great care is needed in giving it, or these fine seeds are sure to get washed out, and a total failure ensue. The dew-pot must be used for all fine seeds—(see page 100).

By Layers.—Layering of the Azalea is done in August and September. The stools of the hardy sorts must be planted in peat soil to insure success in layering.

The Rhododendron.

The propagation of the Rhododendron is by seed, by layers, and by grafting. Seedling stock from the common *var. ponticum* are used for grafting the rarer sorts on. Seedlings may be raised freely by sowing seed on the surface of the open ground of a peaty nature, and in the shade, as in the case of similar full-grown plants, or any other plants of the same class. In the spring prick up the ground under them, and then rake it down to a fine surface, and sow the seed thickly all over the surface under and between the plants, or on a shady border of a peat soil, and draw the back of a spade gently over the surface, and leave it. The ground must not be either hoed or raked for a twelvemonth after the seed is sown. It may be sown in seed-pans and set under a north wall, and must be kept damp. The layering is done as for the Azalea, and the grafting as for the Camellia.

The Camellia.

The Camellia as a flower is too well known to require any description here; but, as a plant, it is scarcely so well known. The Camellia is generally considered by amateurs a difficult plant to manage. Many fail to make it answer their expectations, and get disheartened; but, in my opinion, the Camellia is easy to grow, so as to flower as well as a rose. In doing this a certain simple step has to be taken, which consists in merely subjecting the plant to a mild heat for a few weeks after it has flowered, until the flower-bud has formed itself, and no longer. Then either discontinue the heat or harden the plants off for a week, and remove them out into the open air, and set them under a north wall for the summer months until the middle of October, supplying them with water as required, and once a week giving them some liquid manure. If the Camellias are continued in the house, no heat must be allowed them after the flower-bud has formed, and all the air is ad-

mitted that is possible. If the plants require shifting, it should be done as soon as the flowering is over. Peat and good maiden loam, two parts of the former to one of the latter, is a good compost to grow them in.

The Camellia is not at all tender. In the west of England it may be grown out of doors on a west or north wall. The propagation of the Camellia consists in multiplying it by seed for new sorts. The seed is obtainable from some seedsmen who import it. It is large, and should be covered, when sown, with 1 inch or $1\frac{1}{2}$ inches of soil at the least. Sow the seed in pots filled with a compost of fine peat, sand, and maiden loam, in February or March, and set them in a brisk moist heat; plunge the pots up to the rims over a warm tank or in a hotbed. These seedlings are used for stocks to graft the double sorts on.

Fig. 9.—The Camellia, whip-grafted.

The grafting is effected when the stocks are two or three years old, and is done close to the pot. Inarching used to be the method of grafting, but the grafts will do very well detached from the stool, and attached to the stock, as for Roses, Plums, &c., allowing the stock to retain its top instead of cutting it down previous to attaching the graft. The method used is side-grafting. But grafts of the Camellia will unite very well if even the top is cut off the stocks beforehand, if the stocks are excited a week or fortnight before the operation, and a gentle heat is allowed them after it, and they are kept close and shaded. Tie on the grafts with rofea, and use the grafting-wax to exclude air.

The Camellia may also be propagated by cuttings. In the autumn, say September, select cuttings 3 or 4 inches long, of the same season's growth. Cut them at

right angles at the base immediately below a leaflet, detach the two lower leaves, and insert them in 5-inch pots, 48's, up to the leaves. The soil should be fine-sifted sandy peat. Put four or five in each pot. Close the soil well to the cuttings, give a good watering, and plunge the pots up to the rims in a tan-bed or over a tank with a mild bottom heat. Cover the pots with hand-glasses or large bell-glasses, and keep close until struck, shading from the strong light and sun. By the following spring the cuttings will all be well rooted, and should then be potted off and treated as for mature plants. I have soon had good plants this way, and recommend it before grafting, as both room and time are saved.

The Daphne (*Thymelaceæ*).

The Daphnes are among our most superb shrubs, and are great favourites, both on account of their habit and fragrance as a flower. For fragrance I know of nothing comparable to the *Mezereum* when in flower. One or two good plants of this are sufficient to perfume a small garden. The *D. Cneorum* is a profuse flowerer, and forms a splendid dwarf bed on a lawn. The *Indica rubra* and *I. alba* are most desirable greenhouse shrubs for cut blooms.

The propagation of the Daphnes is sometimes by seed, but chiefly by cuttings or grafting. By seed—of all that bear seed, sown in autumn or early spring. The *Mezereum* is mostly by seed sown in the open ground in drills 2 inches deep in a warm border, or in seed-pans 4 inches deep, the seed being covered $1\frac{1}{2}$ inches with soil. This should be half sandy fine peat, and half maiden loam, well mixed, a good drainage being given. This must be well looked to, as the seedlings should remain two years in the seed-pans, for they are too small at one year old to remove. Moreover, some of the seed may not vegetate till the second season after sowing. The second season the seedlings may be potted off, or planted out into beds of fine peat and maiden soil, although the *Mezereum* will do very

well in any good rich common garden soil of a fine nature.

The seed should be sown in the autumn, and screened a bit from heavy rains during the winter months, but not kept too close. The three-year-old seedling *Mezereums* may be used for stocks to graft the better or rarer sorts on.

The grafting of Daphnes is by means of scions, say 2 inches long, of the last season's growth, and should be done in the month of September, as for the Camellia —(see page 53). I find many make quite a mistake in reference to the situation required for the *Mezereum*. They select a shady place to grow it in, but the best lot of plants I ever saw were some I grew from seed, which were bedded out in the most sunny warm spot I could find in my little nursery. They were dwarf, bushy, and handsome healthy plants, and in the spring each one was a bouquet of itself.

Cuttings may be struck if the short young wood is taken off at the base, nicely cut across at right angles, leaving a heel of the old wood, and inserted in pots of fine peat and sand, and set on a mild heat, kept moist, and covered with a handlight. You may put three pots under a large bell-glass—(see page 101). The Daphnes should be planted where they are to remain as long as they live, as they do not remove well after they have been a few years on the spot without shifting. The common Wood Laurel is used for stocks to graft *D. Indica* and any others on, and may be obtained in many localities by suckers.

The Deutzia (*Philadelphaceæ*).

The *Deutzias* are a very beautiful and useful class of plants, possessing delicate white flowers in the spring. *Gracilis* is a well-known favourite, and forces well, flowering freely. The chief thing is to induce it to make new growth—on this depends a good crop of flowers in the following season. This variety makes a good small bed or clump for the lawn.

The propagation of this species is by cuttings of the half-ripened wood inserted in pots of fine peat and maiden loam, and plunged in a mild bottom heat; or ripened wood of the last season's growth, planted under a handlight in the open ground in the autumn. Or some of them may be multiplied by division of the root, suckers, &c. Any good common garden soil suits the *Deutzias*, as they are quite hardy.

The Cotoneaster (*Pomaceæ*).

Cotoneaster microphylla makes a very pretty lawn tree grafted on 5-feet stems of the common Hawthorn. Being evergreen, and of a recumbent habit, it forms a beautiful weeper for the lawn. It may also be used with good effect to cover unsightly low walls. It requires little nailing, and is one of the best rock plants it is possible to have. I had (or there was where I was gardener) a large shillity rock covered with this, where nothing else would grow. It is a capital thing to train on a low wire fence for an interior division break, and looks very neat; and being full of red berries through the winter, it has a good effect. It may be propagated by cuttings, by seed, and by layers; in fact it will take root freely of itself if allowed a little soil to strike in. The cuttings strike freely if taken off 6 or 9 inches long, and bedded in, as for the common Laurel. The grafting is done as for the Apple or the Pear, and should take place in the spring. The seed should be treated as the Hawthorn—(see page 24).

The Box (*Euphorbiaceæ*).

There are many varieties of the Box-tree. They are all useful evergreen dwarf shrubs, chiefly used as ornaments of the garden, and are very accommodating, being compact growers, always green, growing well anywhere and in any soil. The narrow-leaved variegated kind is very beautiful. They make conspicuous

objects about the grounds, and may be used as a sort of dwarf avenue on each side of a shrubbery walk, or for a neat back break-hedge to borders, &c.

The propagation of all kinds of the Box-tree is by seed or cuttings; but as the latter will grow, surely no other method will be employed by which to multiply it. In the month of August or the beginning of September select the last growth, 4 inches long; trim off the leaves from the lower half of the cuttings, and insert them 2 inches asunder in a shady border of good soil; give water to settle the soil close to the cuttings, and nothing more will be required to be done to them but weeding for two years, at the end of which time transplant them out at 6 or 9 inches apart in some more open spot, where the young trees can develop themselves.

The Kalmia (*Ericaceæ*).

The Kalmia is named after a man. It is one of the choicest evergreen flowering shrubs we possess. Those who admire beauty of construction as well as delicacy of colour should no doubt have a bed of them on the lawn, however small, for there are few things to equal a truss of Kalmia blossoms. It is quite a ladies' flower, being of a most exquisite form, and comparable in tint and substance to a wax flower. Peat soil is indispensable for growing them.

The propagation of this species is by seed and by layers, and with care cuttings may also be struck. The seed, which is very fine, should be sown on the surface of seed-pans well drained and filled with pure peat (not bog earth)—(see pp. 170—180)—of a fine sandy nature. First fill the pans up to the rims within half an inch, and press the soil in pretty firm. Make the surface quite even and smooth with a small pot or a little block of round wood sawn off a stake. Then water the soil in the pan with a fine rose water-pot, so as to soak it through, and let it stand over for an hour; then sow the seed moderately thick over the surface, and give it a very thin sprinkling of fine peat and

silver sand, enough to barely cover it. Set the pan or pans in a cold frame, and keep them close and slightly shaded from the full influence of the sun until the seed is up. Great care is required in watering the seed-pans for some time after the seedlings appear, as heavy or careless waterings will wash them out of their place and cause a failure. The seed should be sown in March or April.

Cuttings may be struck, if sound, young stuff is taken, 2 inches long, and should be inserted in fine sandy peat, and covered with a bell-glass placed in a frame facing the north. The layering is done as for the Azalea—(see page 35).

The Weigela (*Caprifoliaceæ*).

There are several varieties of this, but the *Rosea* is the most popular one, and well worthy of a place in every garden, however small, on account of its dwarf habit and abundant flower. The plant will bear pruning in to any extent. This should be done in the spring, so that new growth may be formed for flowers the following season. The propagation of this species is by cuttings of the ripened young wood inserted in pots, pans, or under a handlight, with a soil composed of peat and maiden loam with a portion of sand.

The Ribes, or American Currant.

There are many varieties of this genus, but only one is worth notice as a flowering shrub, and that is *Sanguineum*, which is very generally known. It makes a pretty spring flowering shrub, and is very ornamental. Some train it on fences or walls, where it looks very well. The propagation of it is by cuttings of the last season's young wood, 9 or 10 inches long, and dug in the soil as for the common Currant cuttings, in the autumn or early spring. Let them remain one year in the cutting-bed, and then transplant, 1 foot by 1 foot 6 inches apart, to remain till finally planted out.

The Aucuba Japonica.

The Spotted Laurel, as some call it. This belongs to the *Monœcious* section of plants, and not to the *Diœcious* class, as seems to be the idea of some persons. If it belongs to the former class, then there is a mistake about the *Aucuba* possessing male and female sections —in other words, one plant bearing berries only and another flowers only, or male and female plants separately, as in the cases of the Yew and Willow. These are *Diœcious* plants, but the *Aucuba* is a *Monœcious* plant—which means the same plant bearing both male and female flowers, as in the case of the Nut, Pinus, Cucumber, &c.

The *Aucuba* is one of the most useful and beautiful classes of evergreen dwarf shrubs we possess. The propagation of it is easy to accomplish. In the months of September and October select the last season's growth, *i.e.* the last growth which will be made the same season. Let the cuttings be 9 or 10 inches long, and firm. Cut them off with a heel of the old wood at right angles, immediately below the union of the old wood and the young. Trim off the leaves half-way up the cutting, and lay them in up to the leaves in light sandy soil: dig them in as for the common and Portugal Laurels, treading the earth firmly on the base part of them. As you proceed trench after trench, tread the soil (which must be made fine) on the cuttings, when one spadeful of soil only is turned on them; but do not tread it after, except a little to form a solid trench to be cut down on or against which to lay the cuttings. They may remain here for two years, when they may be taken up and replanted in beds 1 foot 6 inches apart, or 1 foot 6 inches by 1 foot.

The Aucuba may also be propagated by layers and by seed. The layering is done in the same way as for the Azalea or Laurel—(see page 35).

The Savin (*Juniperus*).

All the Junipers are desirable evergreens, but *Sabina*, or the *Savin*, is peculiarly so. The green Carpet Juniper, or *Savin*, is a most desirable plant, and ought to be much cultivated, as ought also the *Sabina variegata*, for covering embankments, rockeries, dwarf beds, and sloping grounds. These grow so close together and so near to the ground that they well deserve the title given to them, viz. the "Carpet Juniper." It is quite astonishing to me that so few of these are to be found, especially in neighbourhoods abounding with sloping grounds, terraces, and embankments, where the Carpet Junipers would flourish exceedingly well, and last as long as a generation.

The variegated Carpet Savin is a beautiful thing, and should be freely planted on slopes, rockeries, &c. The propagation of the Savin is by layers, by cuttings, and by seed. The cuttings must consist of ripe young wood inserted under a handlight on a dry shady border. The small cuttings require carefully preparing previous to insertion; first, select the half-ripened young wood an inch or two long; cut them below the joint where they are connected with the old wood, at right angles through the connection, with a keen-edged budding-knife, trim off the leaves, &c., and then insert them in fine sandy peat and maiden loam, made solid by pressing it together, and make the surface quite smooth and firm. Place them 1 inch asunder, and set a good handlight over them, after having watered them to settle the soil well to them.

By the following spring (the cuttings being put in during the autumn, about September) they will have made root, which will be indicated by a fresh point of young wood, when air must be given them, and by the autumn they may be potted off into 60-size pots, and plunged on a dry border.

In the following spring they may be shifted into 4-inch pots, and plunged into a shady border.

By Seed.—All the Junipers may be raised by seed

when it can be had. It may be sown in deep seed-pans, or in the shady border, but the former are preferable. Use good soil as for the cuttings, have good drainage, and cover the seed 2 inches with soil. Treat them as for Pinus, &c. Set the pans out of doors in a shady place for the summer, and remove them to a more sunny situation for the winter season.

The Cryptomeria (*Coniferæ*).

This small genus contains very beautiful pendulous evergreen Juniper-like trees. *Japonica* is a handsome shrub, growing similar to the Hemlock Spruce, but will grow higher, and forms a noble pendulous tree, when it can be favoured with room and a damp situation. It may be raised from seed, by sowing it in deep seed-pans in the month of April, and treated as for the *Cupressus*, *Pinus*, &c.

The Taxodium (*Coniferæ*).

The *Taxodium*, or deciduous Cypress, is among our best medium park and lawn trees. It is of a peculiar light green foliage during the summer, and looks conspicuous on a good large lawn among other deeper green objects. Here is a group fit for a small park or a large lawn :—A Cedar of Lebanon, a *Cedrus deodara*, a *Pinus Wellingtonia*, a *Pinus insignis*, a deciduous Cypress, a *Cupressus sempervirens*, a *Cupressus macrocarpa*, a *Pinus imbricata*, a *Thuja occidentalis*, a *Cryptomeria Japonica*, a *Taxus fastigiata*, a *Juniperus pendula*, an *Abies Canadensis*, an *Abies Smithiana*, a *Chamæcyparis sphæroidea* (White Cedar), and a *Garrya elliptica*, a clean standard Scotch Laburnum, ditto Scarlet Thorn, ditto Copper Beech, a clean standard *Pyrus Japonica*, ditto *Pyrus floribunda* (white), and a bed or two of *Juniperus sabina*, and ditto *Variegata*. These well planted on a clean lawn, at a good distance apart, will have a general effect not often met with, and will prove as lasting as a decade of generations.

The propagation of the *Taxodiums* consists in raising them from seed, and by cuttings. The cuttings must be of the firm young wood in the early autumn, inserted in deep seed-pans filled with fine sandy peat and maiden loam of equal parts, and set in a cold frame facing the north, being kept moist. The seed may be sown in April as for the *Pinus* tribes, and treated in the same manner.

The Hydrangea (*Hydrangeaceæ*).

The *Hydrangea* is so well known that it seems almost superfluous to say anything about it here. It is certainly worthy of a more extensive cultivation than it seems to get in some parts. It is propagated by cuttings of the young wood taken off in June and July, 3 or 4 inches long, and inserted in pots or under a handlight, and well watered. Or they may be put into heat, where they quickly strike root. The *Hydrangea* may also be multiplied by division of the root; but to get fine flowering plants in pots, with a large single head of flowers, cuttings must be struck from the young wood, or rather of young wood, as I have said, and as soon as they are rooted, pot them off singly into 4-inch or 5-inch pots, using fine peat and loam. Encourage the plants to grow freely, and continue them in these pots until the following spring, when they should be shifted into 6-inch pots for flowering, or they may be turned into the beds. The peat soil from Dartmoor will produce the blue colour freely.

The Andromeda (*Ericaceæ*).

There are a great many varieties of this beautiful dwarf shrub. *Floribunda* takes the lead in this genus, and is of a very pretty dwarf character, as free flowering and as handsome as a Heath. It makes a splendid bed, being compact and suitable for the centre, around which may be planted with good effect some of the free-flowering hardy Heaths.

The propagation of the *Andromeda* is by seed sown

in seed-pans, as for Heaths, &c. Fill a pan with good sandy fine peat, make the soil firm, and water it; let it stand for an hour, sow the seed, and cover it as thick as a sixpence, and no more. Set the pan in a propagating-house, and cover it with a bell-glass, handlight, or lay a flat square of glass over it.

By Layers.—This is the most successful way to multiply the *Andromeda*. In the month of September or October lay down some of the outer branches in the ground, trimming off the leaves, &c., that are to be buried. Set the branches in the soil, which must be peat, 3 or 4 inches, cover the part, bringing the ends of the branches upright out of the ground, and press the soil moderately firm on the buried part. Let them remain for twelve months, when the layers will all be rooted, then remove them, and plant them out into beds 1 foot 6 inches by 1 foot asunder. The soil must be peat.

The Hardy Heath.

All the hardy Heaths are most desirable and useful plants. Considering the beauty of this tribe, the hardness of their constitution, their remarkable capacity for usefulness, and their cheapness, I am totally at a loss to conceive why they are so little used as permanent ornaments of our parterres. I know of nothing as dwarf flowering and permanent hardy shrubs so well worthy of a place in every well-devised pleasure-garden. All that is required is a dry subsoil, and a compost of sandy peat and maiden loam. Rough stones may be used to secure a dry subsoil: a foot or 20 inches of these put in the bottom of the bed, with a foot of peat, rough maiden loam, and turf, all chopped up with the spade, will grow Heaths well.

The *Erica vulgaris* forms one of the most beautiful beds possible, and for rockwork it is a splendid object. So are *E. cinerea purpurea* and numbers besides, all of which are hardy.

The propagation of Heaths is comparatively easy.

They may be obtained by seed, by cuttings, by offsets, or side-shoots, and by layers.

By Cuttings.—As soon as the young wood has become firm, take them off an inch or two long, trim off the lower leaves, cut clean at right angles below a leaflet, and insert the cuttings under a handlight on a shady border in a compost of fine sandy peat; or insert them in seed-pans, and set them in a close frame facing the north.

By Layers.—During the autumn or spring lay the branches in the ground, pegging them down, and, in the course of twelve months, an abundance of young plants may be taken off and planted out.

By Seed.—In the summer gather the seed, preserve it in dry bags till the spring, and in the month of April sow it under handlights or in seed-pans filled with fine peat. First let the drainage be good, then make the soil firm, and water it so as to soak it through; let it remain for an hour or two, then sow the seed over the even surface, and sprinkle enough fine sandy peat over it to barely cover it, and set a handlight over it. A little morning sun will be beneficial, but shade from the sun the rest of the day, until the seedlings are well up, then give air and light. The seed-pans may be set in a shady part of the propagating-house with advantage.

The Hypericum, or St. John's Wort.

These are all very useful and interesting shrubs, and are remarkable for their hardiness of constitution. *Calycinum* is distinguished for its fine foliage, large flowers, and for growing on embankments and in dry and poor soils, under shrubs, &c. All the St. John's Worts are remarkable for enduring poverty of soils and droughts, and as the foliage is pretty and the flowers are handsome, they would be most useful as low shrubs on those open and dry grounds in America and Australia, where few things else will live.

The propagation of the genus is by offsets, cuttings, and seed. By seed it may be raised freely. Sow in

seed-pans in March, and set on heat for the tender ones, and in a cold frame for the hardy sorts. By cuttings of the sound young wood in pots of peat and loam and sand. By offsets or suckers at any time during the autumn and the spring.

The Veronica (*Scrophulariaceæ*).

There are a great many varieties of Speedwells, all of which are more or less beautiful. They include some fine flowering shrubs, as *Lindleyana formosa, Sanguiniflora, Salicifolia, Madame Frezelle,* &c., all beautiful shrubs that attain to a good size in the West of England, where they flower abundantly; but I am not aware that they will stand the climate of the north through a sharp winter.

The propagation of the *Veronica* is by seed, by cuttings, and by layers.

By Cuttings.—Take cuttings off at any time during the summer, 2 or 3 inches long, of the young wood. Trim off the leaves, cut below a leaflet, and insert them in pots filled with peat or leaf-mould, sand, and maiden loam. Water and set them in a pit or frame.

By Seed.—Sow the seed in seed-pans in the spring, and set in a warm house, pit, or frame till well up, when they may be hardened off and finally set out of doors; and, as soon as large enough, plant the seedlings out into the ground or pot them off.

The Pomegranate (*Myrtaceæ*).

This tribe, when in infancy, might be mistaken for a Myrtle, but they are much more beautiful when in flower, and the fruit is of a fine apple shape. The Pomegranate is too tender to stand our climate, except on a warm south wall. It may be propagated by seed and by cuttings, which are the most convenient methods of multiplying them.

By Seed.—Sow the seed in deep seed-pans in the month of March. Cover it half an inch with fine

leaf-mould, silver sand, and maiden loam (equal parts), and set the pan or pans on a nice gentle heat. When the seedlings are 3 or 4 inches high, pot them off singly into small 60-size pots, and continue them in a close cold frame for a week, when air may be admitted. The following spring shift them into 5-inch pots, and continue them in a frame or in a good house: give but little water through the winter.

By Cuttings.—At any time they can be had, take short cuttings, 2 or 3 inches in length, of the sound, half-ripened young wood, with a heel of the old wood, trim off the leaves from one-half the cutting, and make a clean cut immediately through the base, leaving a heel of the old wood, and insert them in pots filled with sandy peat and maiden loam of equal parts. Give water, and plunge in a tan-bed, or in a sand-bed over a warm tank, or set in a mild heat in a frame, pit, or house. Pot off as soon as well rooted. The double-flowered Pomegranate is a most beautiful plant for the conservatory. Age is necessary for them to flower and bear fruit well.

The Rose.

The Rose family is divided into two classes—viz. Climbing Roses and the Shrubby Roses. I only include the last class under this head, and shall refer to the Climbing Roses under "Climbers." The Shrubby Roses are numerous, and severally include many divisions, as the *Provence, Gallica, Moss, Bourbon, Perpetual, China, Scotch, Damask, Austrian Briar, Macarteney, Rosa Lawrenciana*, or *Miniature Rose*, &c. The Provence Roses are, no doubt, among our noblest and finest Roses, being double and very beautiful. Another is the Crested Provence, or Crested Moss, as some call it; but I am convinced it is a Provence Rose, and a species, although sometimes it will produce flowers without the crested calyx, and then no one can tell it from a Provence. This is one of the most beautiful things it is possible to possess of the kind, and should be in every good garden. It is a summer Rose,

The *Gallica*, or French Roses, are unsurpassed, I may say unequalled, by anything in the whole Rose world for the character of the flower, richness of colour, and general beauty. As a Rose, the French, or *Gallica*, evidently far surpasses the Perpetuals for perfection of form. Many of them equal, if they do not excel, the Ranunculus, and no well-devised garden should be without a collection of them.

The *Bourbon* Rose is a very exquisite class. *Acidalie* may be taken as a type of a Bourbon Rose, and is well known. *Coupe d'Hébé* is another, and it would be difficult even now to find among all our new Roses a match for either of these, especially the last. No collection can be said to be perfect without *Coupe d'Hébé*, a *Crested Provence*, *Acidalie*, and *Chenédolé*, a most noble Rose.

The *Rosa Lawrenciana* are a class of miniature Roses only fit for pots, and they are most exquisite, and should be in every greenhouse. The *Austrian* Yellow Roses are most beautiful, and so are the Persian Yellow. This is a real golden yellow, and has a fine form. To get this Rose to flower well very little pruning must be done to it. It must be grown freely by giving it good soil and manure, and so to get strong growth annually. Then cut one half the growth back to within three or four buds in the early spring or autumn, and leave the other half of the preceding year's growth the full length, or nearly so, merely tipping the ends of the long shoots, and if a vigorous growth is maintained year by year, no lack of abundance of this Rose will be felt.

The propagation of Roses consists in multiplying them by seed, by cuttings, by grafting, and by budding.

By Seed.—Gather the heps in the autumn as soon as they are ripe, which generally is late; bury them in sand for a month or two, then take them out of the sand, break them up, and clean the seed. Sow it in deep seed-pans filled with maiden loam and dung of equal parts, and set the pans on a gentle heat, or in a warm forcing-house, and shade it till up.

By Cuttings.—Whenever Roses have done flowering,

cuttings may be taken of the wood that has borne flowers, immediately they have fallen off. The cuttings may be long or short; two buds will grow—one buried in the soil, and one above it, or the cuttings may be 7 or 8 inches long, but in this case they should be inserted in the ground during the months of August and September for summer outdoor Roses. When the cuttings are small they are best put into small pots. The pots must be filled one-third with broken crocks, and then up to the very top with the soil, and made moderately firm before inserting the cuttings. Set in a close frame or house; when the cuttings are from outdoor Roses they should be inserted on a warm border, and planted full half-way into the soil. The soil should be maiden loam and decayed stable dung, quite old, of equal parts, and well mixed. Make a clean cut at right angles at the base of the cutting, and just below a leaflet or bud, leaving all the leaves on the cuttings above soil. Close the soil well to the base of them, give a good soaking with water, and all is done till they are struck. In the March or April following they may be taken up carefully, and potted or planted out into beds. If potted, plunge the pots in cinder ash, tan, cocoa-nut fibre, or sawdust.

By Budding.—The time has been when buds of Roses must not have any wood attached to them. It was considered fatal if there were any, but now we find that it makes no difference to the thing whether the bud has all the wood that is taken off with the bud attached to it, or not. If the stock is in good order, *i.e.* if the bark of the stock will run, or separate freely from the wood, the bud may contain all the wood attached to it, or it may be taken out, whichever is most convenient. This is a very advantageous discovery, as it frequently cannot be detached on account of the ripeness of the wood of some Roses being in advance of the stocks to be budded. Budding may be done whenever stocks can be found in a proper condition, and may be performed close to the ground, or at all heights from the ground—(see page 69). Insert the bud, and tie in with rofea

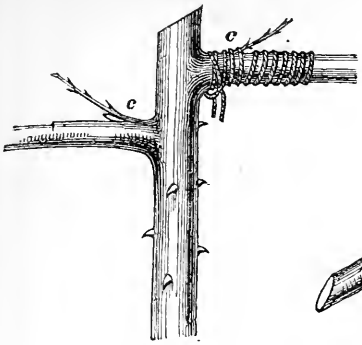

Fig. 10.

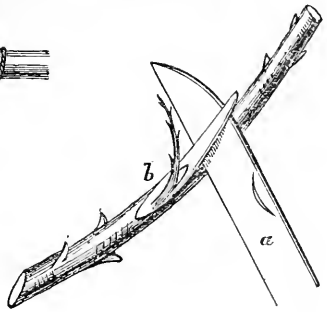

Fig. 11.

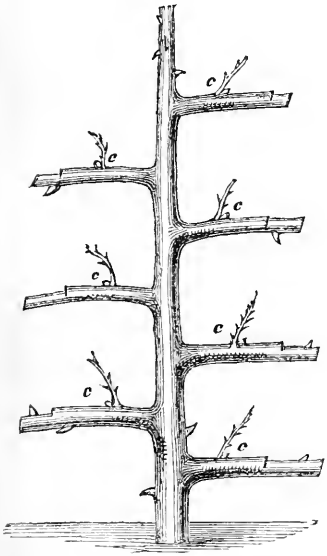

Fig. 12.

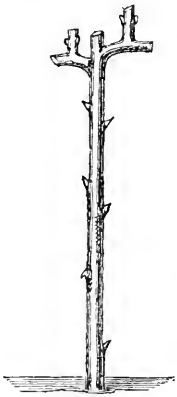

Fig. 13.

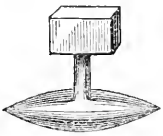

Fig. 14.

Fig. 10.—Standard Rose budded.

Fig. 11.—The part from which the bud is taken, showing the manner of taking the bud off; *a*, the blade of the knife, showing the best practical manner of taking the bud off; *b*, the bud.

Fig. 12.—The way to form a Union Rose of various colours by budding.

Fig. 13.—The Standard Rose, one year old, cut back.

Fig. 14.—The bark racers, for opening the bark previous to budding and to receive the buds, *c c c c*.

or cotton, or Berlin worsted. After a month release the ties, and finally remove them.

By Grafting.—During January, February, and March graft Roses in pots. The Dog Rose may be grafted as soon as potted, and put in a close frame. The grafts may consist of any of the classes, with three or four buds in them. Good sound last year's wood is the kind to use, 4 or 5 inches long. Use grafting-wax to exclude air after

Fig. 15.—The Rose, whip-grafted.

Fig. 16.—The Rose, bud-grafted.

the graft is firmly tied on. This is a very quick way of producing Roses on the Dwarf Dog Rose stock, as a good Dwarf Rose in a pot may be produced in three months in flower, and with a good head. I well remember, many years ago, trying this method of getting Dwarf Roses quickly in pots according to the directions given by Mr. Rivers in his "Rose Amateur's Guide," but I used no heat, only a cold close frame, with perfect success.

Good Dwarf Roses may be easily produced by grafting with nothing more than a close cold frame, set in a southern aspect by March or the beginning of April, by gathering the stocks from the hedges in January, and potting them, and grafting them at once; and if they are of the Perpetual classes they may be turned into the ground in May, where they will grow and flower freely all the summer.

By Layers.—Layering of Roses chiefly applies to the Climbing classes; still Dwarf Roses of the shrubby classes may be layered as a very sure way of getting some sorts that are difficult to obtain by cuttings, grafts, &c., as the Moss, and some of the Provence kinds. In layering bend the wood of the last season's growth, and find out what buds will be in the ground, then cut a tongue at one of the buds on the side that will be under when the branch is layered in. Let the tongue be an inch long from the bud upward; carefully bring the end of the shoot upright, and the tongue will open and stand out. If it will not do so, place a barley-corn, or an oat, between the tongue and the branch to keep it open. Then lay the branch in the ground 4 or 5 inches under the surface, and gently press the soil on the layer. The layering may be done in August, or in the early spring.

If the weather is dry, water must be given the layer to encourage it to emit roots, and a little mulch or moss, &c., put over the part layered will much benefit it if the weather is hot and dry. This is an easy and sure way of getting Roses on their own roots, if any of the sorts are difficult to obtain by cuttings.

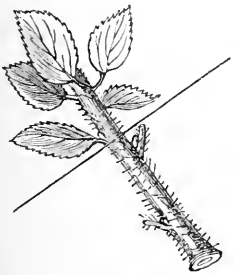

Fig. 17.—Ordinary Rose cutting.
The line shows the depth to insert it in the ground.

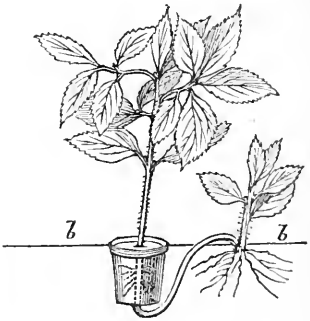

Fig. 18.—The Rose layered in a pot, passed through the bottom of the pot; *b b*, ground line.

BOOK IV.

ON THE PROPAGATION AND PLANTING OF HARDY AND OTHER CLIMBING PLANTS.

The Ivy (*Araliaceæ*).

As an evergreen climber there is nothing comparable to the Ivy, and as such it is both ornamental and useful. The ways in which the Ivy may be used as an ornament are almost too numerous to mention. As a waterproof covering to a dwelling-house, shed, &c., nothing can equal it. My master, from whom I learnt gardening, had the back of his dwelling-houses covered with Irish Ivy as a protection for them. The walls being boards, we used to clip it close once a year in the spring, and in the course of a few weeks it would be covered again with close foliage as thick as a mat; and soon it would be completely coated with leaves like tiling, so that no water could get at the walls, while the appearance was charming—a beautiful foliaged-clothed wall, far before a whitewashed one.

For covering walls, and as an under shrub for shrubberies and banks, nothing can surpass the Irish Ivy. The variegated kinds are exquisite subjects for covering walls of every description where diversity is required. The Gold and Silver Ivies are beautiful kinds for dwelling-houses; being of a more compact and less rapid growth than the Irish, they form a very neat and secure covering. It is necessary that these Ivies be planted when young, so that the new growth may be made on

the spot where it is permanently planted, then it will adhere to the fence or wall of itself as it grows; but when old plants are used, nailing must be resorted to, which is not the thing. The Ivy will cling to the wall of itself if the young growth is made at the base of the wall, and no further trouble is needed.

The propagation of the Ivy is simple. During the months of October and November, or in the spring, take cuttings of the last growth 6 or 9 inches in length, and plant them in a shady border or bed; dig them in with a spade, burying them half-way in the soil, which should be of a light nature. With some of the variegated kinds it will be necessary to put the cuttings in pots, and strike them in a mild heat, for they are not so free to root as the green kinds.

A uniform moisture is required to strike the cuttings of Ivies. If they do well they will be fit for planting out within a twelvemonth from the cutting.

The Clematis (*Ranunculaceæ*).

There are a great number of varieties of this tribe, all of which are more or less desirable, being beautiful and useful climbers. The uses to which they may be put as ornaments of the garden, the conservatory, and even the window, are nearly unparalleled among climbers. Some of them make beautiful wreaths to the window of the sitting-room, grown in pots inside the house, and trained on the frame of the window; whilst others are splendid subjects to train on umbrella wire-work—as *Montana*, *Flammula*, and *Viorna;* the first two white, the last purple—while for festoons and arches nothing can match them, at least in my opinion. Even as bedding plants many of them are superb. One thing, as a rule, must be borne in mind—*i.e.* the Clematis must be permanently planted where it is to remain for some years, or else it will not prove itself what it is capable of as regards effect. The Clematis tribe may be propagated by seed, by

cuttings, by layers, and by division of the root in the case of some.

By Seed.—Sow the seed in deep seed-pans in March, using maiden loam, sandy peat, and pulverised manure. Cover the seed half an inch with soil, and set in a cold frame. Some will require heat if the seed is imported.

By Cuttings.—Take short side-shoots of the young firm wood, insert them in pots of fine peat and maiden loam, and place them under a handlight or large bell-glass on a mild heat—a tan-bed is the best.

By Layers.—In the spring or early autumn lay the last season's growth 2 or 3 inches below the surface, and put some fine sandy peat and maiden loam on each joint laid; each branchlet of young wood will emit roots at the base. By the following autumn the young plants may be taken off the stool. The tender sorts must be laid in pots.

By Division.—When shoots spring from the roots, they may be taken off as soon as they are 3 or 4 inches long in the spring, and potted.

The Wistaria (*Fabaceæ*).

The Wistarias are a small genus of very beautiful climbing plants, of which *Sinensis* is about the best. This is a magnificent plant to train on the roof of conservatories, on walls, doorways, &c. It makes a splendid object trained on window-hoods, along verandahs, entrances, &c., where it can display its lovely laburnum-like blue racemes of pea-shaped flowers to advantage. The Wistarias may be grown in any good soil containing sand. The propagation is by seed, by layers, and by cuttings.

By Seed.—Sow the seed in pots or pans in the spring, using sandy peat and maiden loam; bury the seed one inch, and set the pan or pot containing it in a good lively heat. As soon as the seedlings are large enough, pot them off singly, and set them in a warm frame for a few weeks; then harden off, and continue them in a cold frame for a season.

By Layers.—In the autumn or early spring take the last season's ripe wood and lay it in the ground, or set 6-inch pots close to the old plant, and draw the shoot through the hole at the bottom of the pot, and cut a tongue as for Rose layering; or scrape the bark of the shoot on one side at an eye (let this be about the middle of the pot), and fill it up with the same kind of soil as used to sow the seed in, employing a little more sand. The shoot layered must not be detached from the old plant for a year.

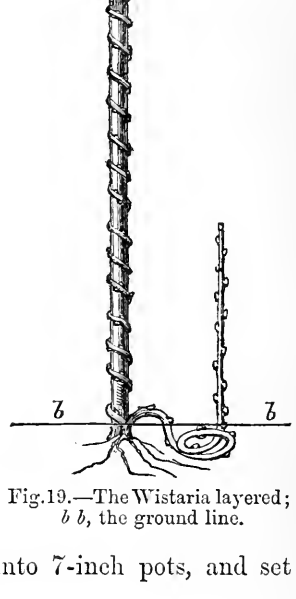

Fig. 19.—The Wistaria layered; *b b*, the ground line.

By Cuttings.—Cuttings may be struck, if taken off in the autumn of the last growth. They should be 7 or 8 inches long, and put into 7-inch pots, and set or plunged in a mild heat.

The Jasmine (*Jasminaceæ*).

The Jasmine can scarcely be called a climber, but a rambler like the Rose: nevertheless, it is used for the same purpose as a true climber, and is as well suited for covering walls, fronts of dwelling-houses, &c. *Jasminum officinale* is the most useful, and is also a great favourite among the fair sex. The agreeable fragrance of this variety is seldom at fault, as is the case sometimes with the Hyacinth. In some localities the Jasmine grows like a bramble for luxuriance. The yellow-flowered sorts are very pretty, but not so sweet as *officinale*. The propagation of the Jasmine is by cuttings, by layers, and by grafting.

By Cuttings.—Take cuttings, 6 to 9 inches long, of the sound last season's growth; the lower part of the young wood is the best. Trim them as for Currant cuttings, and insert them into 7 or 8-inch pots filled with maiden loam and sandy peat, and set in a cold pit or frame; or insert them in the ground on a warm border in the autumn.

By Layers.—The layering may be done in the autumn. The base of the young wood will emit roots freely when laid in a nice light soil.

By Grafting.—Any of the rare tender varieties may be grafted on stocks of *officinalis*. Graft close to the ground, using clean grafts of the last season's growth.

The Lonicera, or Honeysuckle.

These are so well known that any detailed description of the tribe would be superfluous; I will, therefore, merely mention a few things in connection with them. All the evergreen sorts are very desirable climbers. The Trumpet Honeysuckle is an excellent species—I mean the scarlet Trumpet: very little of this is seen, which is surprising to me, for it is a really good thing. It presents a fine appearance on a pillar in a conservatory, or trained along a verandah facing the south, or around a window. The *L. reticulata* is one of the most splendid objects it is possible to have for a sheltered place out of doors, or in a cool conservatory; trained on a trellis, it forms a beautiful chequered background. The Honeysuckles may be propagated by seed, cuttings, and layers.

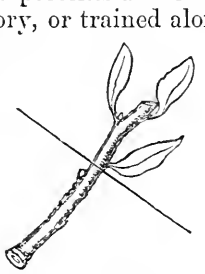

Fig. 20.—Honeysuckle cutting. The line shows the depth to insert it in the soil.

By Seed.—Some do not bear seed well, but those that do may be multiplied by seed sown in the spring in deep seed-pans, and set in a cold frame; or, if of the more tender sorts, set in a warm pit or frame.

By Cuttings.—Cuttings of Honeysuckles may be

struck if they are of the current season's growth, short, and not hollow; but when the wood gets old and hollow, it is of no use attempting to strike such cuttings. They should be nicely cut at the base, and inserted in pots filled with peat, maiden loam, and a little sand, and set in a mild heat till rooted.

By Layers.—All the Honeysuckles will strike root freely by layers. In the early spring lay any of the

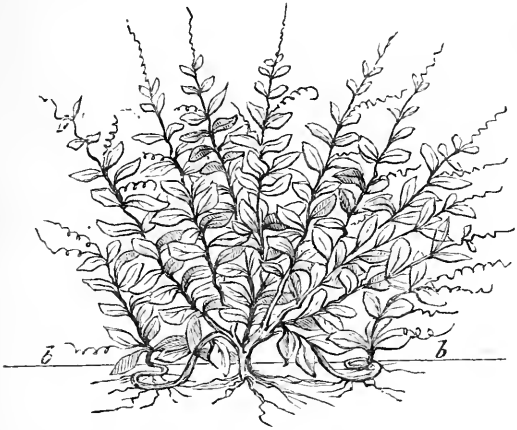

Fig. 21.—The Honeysuckle layered; *b b*, ground line.

spare wood in the ground or in pots, and it will root well by the autumn.

The Bignonia (or *Tecoma Bignoniaceæ*).

This is a tribe of the most magnificent hardy and half-hardy climbing plants we possess. *B. radicans* and its varieties are deserving of more favour than they have ever had as yet. Its fine foliage and large trumpet-shaped flowers, with their rich colour, should certainly command all the attention good climbers deserve. *B. radicans atro-purpurea* is of a rich dark crimson purple; *B. flava* is a yellowish flower; *B. radicans sanguinea* is of a blood-red; and *B. grandifolia*

is a splendid fiery-red flower. All these will do well on a south wall and a dry soil, and no house wall should be without one or more of them. They are not dear, nor difficult to grow, and their propagation is easy.

By Seed.—When seed can be had, sow it in pots or deep seed-pans in the spring, in peat, maiden loam, and sand. Cover the seed half an inch, and set in a good heat till it is up; then give air and harden off, and pot off as soon as the seedlings can be well handled.

By Cuttings.—During the summer months select the short side-shoots half ripened; take them off with a heel or good sound base. Trim the cuttings neatly at the base, and insert them in pots of fine sandy peat and maiden loam. Set the pots, or plunge them into a tan-bed, and put a light over them until the cuttings are rooted; then lift it off, and continue the pots plunged for a fortnight longer. Many of them may be propagated by cuttings of the roots inserted in pots of sand and peat of equal parts. The choicer kinds may be propagated by grafting them upon seedling stocks of *Radicans*. The grafting must be done close to the pot, using the sound young wood well ripened; do it in the spring as for Roses.

The management of the Bignonias may be assimilated to that of the Grape Vine, on the long-spur plan of pruning, as the flowers come from well-ripened eyes of the previous year's wood. Seeds of the common varieties may be had of most seedsmen. *Catalpa* and *Stans* seed can easily be had for plants or stocks.

Layering may also be resorted to with advantage. The base of the young wood will quickly emit roots if kept in a moist state and some heat.

The Passion-flower.

There are several varieties of hardy Passion-flowers, but none can excel the *Cærulea* for the beauty of its flowers and the abundance of its dark foliage.

The Passion-flower is generally seen to much disadvantage on account of the state of the plant, for it is seldom sufficiently cared for to prevent a wilderness confusion about it. Being a rapid grower, a slight omission in the training in the growing season results in complete disorder and a want of display of the beauty of its marvellous flowers. These flowers come on the current year's wood, consequently it should be thinned out, as for a Grape Vine, leaving, say, one principal leader on a space of about 2 feet. This leader may be permanent, and should be spurred in, from which will come the young wood bearing abundance of flowers. This young growth should be tied or nailed in, so as to just cover the trellis, wall, or whatever else it may be, and no more; then there will be as much order as will display the flowers to advantage.

The propagation of the Passion-flower is by seed, by cuttings, by suckers, and by grafting.

By Seed.—Sow the seed in pots or seed-pans in the month of March, using maiden loam and pulverised dung, or leaf-mould and a little sand. Cover the seed half an inch with fine soil, and set it in a mild heat.

By Cuttings.—Cuttings of Passion-flowers may be taken at any time and inserted in fine peat soil, and set in a mild heat. They should be short-jointed and of the young wood.

By Grafting.—Use the common *Cærulea* for stocks; any of the choice tender species may be grafted on it. Graft close to the pot, and at any time ripe young wood can be had. Common whip-grafting will answer. Plunge the pot, and cover the union with the plunging material. The graft will soon unite with the stock.

The Rubus (*Double Bramble*).

This is a very uncommon thing, although it is a beautiful flowering climber. The leaf much resembles the common Bramble, but is of greater density and more abundant. The flowers are large, and as double as a small Rose. The plant, as a fine dark-foliaged

climber on a trellis, or on the walls of the dwelling-house, is very desirable, and well worthy of a place on any good house.

R. Fruticosa bellidiformis is a fine rose-coloured flower, and very pretty. The Double Brambles may be propagated by cuttings, by seed, and by layers.

By Cuttings.—Take short stout cuttings of the current season's growth, and insert them in pots of maiden loam and leaf-mould, and plunge the pots in a tan-bed or in sawdust.

By Seed.—Sow the seed in pots or pans filled with maiden loam and leaf-mould, cover it a quarter of an inch, and set in a mild heat till the seedlings are up, when they may be set in a cold frame, if of the hardy kinds, but if from the tender sorts continue the seedlings in a warm house.

By Layers.—Any of the half-ripened wood will emit roots, and may be laid in pots for the tender sorts, and in the ground for the hardy ones, keeping them damp.

The Aristolochia (*Aristolochiaceæ*).

The Aristolochias are a curious class of climbers, scarcely worth notice except for their foliage, which is certainly handsome in some sorts, such as *Ciliosa*, which is beautifully marked. *Sipho* also has noble foliage, but the flowers are very insignificant. They are extraordinarily liable to insect pests, and a very disagreeable smell attends the handling of them. Still, some of them are desirable and fast climbers as foliage plants. They may be propagated by seed, by cuttings, and by offshoots from the root. Sow the seed in March in pans or pots, and set in a mild heat. Cuttings of the side shoots during summer in sandy peat, and in a mild heat; shoots from the roots in the spring.

The Virginian Creeper (*Vitaceæ*).

The *Ampelopsis*, as it is called, is a tribe of rapid climbers, resembling the Grape Vine. *Hederacea* is a

very useful and peculiarly rapid climber. A plant of this will cover a larger space of wall than any known climber in the same time. This clinging creeper will cover a brick wall most rapidly, and will support itself. It has a peculiar and beautiful disposition attached to it, viz. it changes the colour of its foliage from green to a light red in the autumn, which gives it a quality equal in value to a flowering climber. I know of none better adapted for quickly and neatly covering the walls of the dwelling-house than this. It is a deciduous plant, which may be some objection to it.

The propagation of the *Ampelopsis* consists in taking cuttings, and inserting them in pots or in the ground during the autumn: also by layers, which strike root freely by merely laying the vines on the ground, with a stone or peg to fasten them down.

The Pyracantha (*Pomaceæ*).

This well-known, beautiful berry-bearing plant is of the Thorn class. It is not a true climber, but will cover a wall by nailing and training, and make a permanent wall plant of considerable beauty for a much longer period than any other known evergreen, with much less trouble. It is not particular as to soil or situation. It bears beautiful vermilion berries in large clusters, which are of a lengthy duration, from the early autumn even till late spring—which renders it desirable for a permanent wall plant, the berries being very conspicuous during the dull winter months.

The propagation of the *Pyracantha* is by seed, sown as for Haws—(see page 24)—by budding and grafting.

The Periploca (*Asclepiadaceæ*).

A very small genus of narrow-leaved, light-foliaged climbers. *P. Græca* is the chief one, and has the advantage of rapidly covering a wall or trellis, which is its principal recommendation. They may be propa-

gated by cuttings and by layers. Short side-shoots for cuttings inserted in pots of peat and maiden loam, and set in a mild heat during the summer. Layering may be done from spring to autumn.

The Kerria, or *Corchorus Japonica* (*Rosaceæ*).

This is a small genus of very beautifully-flowered plants, which can hardly be put with the climbers, but as it makes a capital covering for a wall of, say, 6 or 8 feet high, I have put it under this head. It is a plant seldom met with now—for what reason I cannot tell, for I know of nothing comparable to either the single or double variety in regard to its flowers. Those of the last named are not equalled by the double Banksian Rose, except in fragrance. They are of a lovely soft yellow colour, and have a pretty effect in bouquets. The foliage is of a fine, elongated, serrated, and undulated form.

It may be propagated by cuttings, by a division of the stool, and by layers. Cuttings may be struck from the side-shoots during the summer, inserted in pots of fine peat and maiden loam.

The Solanum.

Solanum Jasminifolium is a shrubby climber, bearing fine foliage and large clusters of pale blue flowers, which are very showy and pretty. It is a strong grower, and will cover a good space of wall in two years from a moderate-sized plant. It is propagated by cuttings, and strikes freely. Cuttings 4 or 6 inches long, taken from the season's growth in the autumn, and put into pots filled with maiden loam and dung, or sound young wood 3 inches long, and inserted in pots of fine peat, maiden loam, and dung, and set in a gentle heat, will root freely. It forms a pretty pot plant from small cuttings, as above, for a year or two, flowering dwarf and freely for some time, and has a good effect in the conservatory.

The Climbing Rose.

The Climbing Roses are divided into six natural classes, of which some distinct feature characterizes each division: for example, the *Banksian Rose* is a peculiar and unique, small-flowered class, differing considerably from all other climbing Roses. Then there is the Ayrshire Rose, which class contains a tribe of most rapid growers, with flowers not so double as could be wished for in some varieties; but for rapidly covering a wall or trellis-work of any kind in any aspect, or making a "wilderness," &c., nothing can well compete with this division. For budding on 9 or 10 feet stout stocks they make noble objects as weepers. Then there is what is called *Rosa multiflora*, so termed on account of its abundance of flowers, which grow in immense clusters, and form grand objects as pillar Roses trained on high larch poles, over archways, &c.

The *Rosa sempervirens*, or Evergreen Rose, is a beautiful class. To this division belongs the favourite *Félicité perpétuelle*—a most abundant flowering, soft, white, double Rose with small flowers. Then there is the *Boursault Rose*—a class remarkable for splendour of foliage, which may be considered its chief feature as a recommendation, except that they are extraordinarily fast growers, and therefore to be recommended as climbers, as well as for dwarf stocks on which to bud or graft Tea Roses.

Whenever a really great and good effect is a desideratum with Climbing Roses, it is necessary to lay a good foundation previous to planting, by deep digging and well manuring; then they will throw up strong and long shoots annually, and by training these in, and cutting the previous year's growth clean out to the ground, an abundant flower will be the result throughout. The propagation of Climbing Roses consists in layering and by cuttings.

By Cuttings.—In the month of September, towards the latter end, or the beginning of October, prepare a bed of fine maiden loam and decomposed stable dung,

well mixed, on a south side. Then select cuttings of the sorts to be multiplied, choose the last growth wood 6 or 8 inches long with a firm heel, cut the base of each over with a keen-edged knife, and trim the leaves from the lower half of them, and insert them into the prepared bed 2 or 3 inches asunder, with a dibber made out of a stick the size of a man's finger; set the cuttings well into the soil with this dibber up to the leaves left on, and close the soil well to the base of them, and when all are in, give the whole a good soaking with water from a medium rose, to settle the soil well to the cuttings. If a frame or handlight can be spared, it may be put on them and kept close for a few weeks until they have emitted root, then air may be given. If they are doing well, the leaves left on them will soon drop off, and the cuttings will carry a healthy appearance. Good drainage must be secured for the bed by a layer of coarse siftings. By the following March the plants may be taken up and potted, or planted out.

For the Banksian Roses it is requisite to insert the cuttings in pots of maiden loam and fine peat, and set in a frame or pit. It is necessary to be very careful not to over-water the cuttings.

The Ceanothus (*Rhamnaceæ*).

This is a lovely wall plant, but it requires to be nailed. It is of a lively blue when in flower. The foliage is small, but moderately free, and it should have a south or west aspect, being well adapted for training on a wall between windows where the spaces are small, and on verandah trellis-work, &c., or at the back of a cool conservatory. The propagation of this species consists in multiplying them by seed, and by cuttings. *Ceanothus Azureus* will do well on open walls in the western counties, and may be easily multiplied by seed. Sow the seed in pots or seed-pans in the spring, filled with sandy peat or maiden loam and leaf-mould made fine, and set on a mild heat till up.

By Cuttings.—At any time during the summer take cuttings of the short firm laterals, and insert them in pots of sandy peat, and plunge in a tan-bed, or over a tank with a very mild heat, or cover them with a handlight.

The Myrtle (*Myrtaceæ*).

The Myrtle is not a climber, but I have brought it under this head because it makes a capital wall plant by training, and the broad-leaved variety flowers splendidly on a wall. In the western counties, about Torquay, &c., the Myrtle flourishes exceedingly as a standard on lawns, &c., where it attains to the size of the Laurestine in the midland and northern counties; and in some places it luxuriates on walls to an amazing size, growing to as much as 10 or 15 feet high on a wall. No comment is really needed here, for every one knows the Myrtle as a pot plant.

The propagation is by seed and by cuttings. In the month of September take cuttings from the last summer's growth, 2 or at most 3 inches long. Make the cuttings just below the new growth, but not much into the hard wood; trim off the leaves with a pair of propagating scissors from one-half of it, and make a clean cut at its base with a small fine-edged knife, and then insert them in 5-inch pots filled well up with fine sandy peat, or maiden loam, and pulverised old dung, or leaf-mould of equal parts, together with a little silver sand. Give good drainage to the pot by placing a handful of siftings over the crocks, and fill the pot up to the rim firmly. Then insert the cuttings 1 inch apart all over the pot, letting them into the soil up to the leaves, and close it well round them.

The proper way is to insert a row all round the pot, close to the pot first, and then fill up the middle so as to give a neatness to it. This holds good in all such cases. When the pot of Myrtle cuttings is filled give them water, and set the pot in a cold frame, or under a handlight, or put a bell-glass over it, plunging the pot

in sawdust, sand, or tan, and shade the cuttings. The seed may be sown in March in pots or seed-pans, covering the seed half an inch, and set in heat.

The Lathyrus, or *Everlasting Sweet Pea.*

The *Lathyrus* is a class of the Sweet Pea genus, much to be recommended as an ornament for our cottage and villa gardens. The *L. grandiflorus* is no doubt one of the most magnificent hardy perennials we can possess, and *L. Latifolius* is a truly splendid thing, flowering in large clusters of white, and one with what are called scarlet flowers, although they are not scarlet, but a very deep pink. It is difficult to get the seed of *Grandiflorus*, but it can be propagated easily from the division of the root. *Latifolius* may be freely multiplied by seed sown in pots in the spring, on a gentle heat first, and then planted out. It may also be propagated by division of the root, like *Grandiflorus*. This should be done in March or April.

The Atragene (*Ranunculaceæ*).

This is a very peculiar Clematis, on account of the compactness of the foliage upon the stems, and for the fact that it clasps the object on which it grows or climbs. *Austriaca* is of a fine dark foliage, and has double white flowers. It answers admirably for an archway, pillars, &c. One or two main leaders should be permanently laid in, and then all the laterals cut back close to the leader; thus a neat archway or pillar will be formed.

The propagation of this class of Clematis is by cuttings, by seed, and by layers. Cuttings of the ripe young wood in the autumn, 6 or 8 inches long, and planted half the length in the soil, as in the case of the Gooseberry or Currant. The soil should be dry naturally, and of a sandy kind. By seed:—Sow the seed in the spring in deep seed-pans, using sandy maiden loam and leaf-mould of equal parts. Cover it a full

half-inch, and set in a cold frame, and keep close and moderately moist, till up well above the soil, when the seedlings may be set out in a shady spot. The ripe young wood may be layered in the autumn or early spring.

ON GREENHOUSE CLIMBERS.

As these include our best ornaments of the conservatory, and outdoor decoration for summer, no collection of plants can be said to be complete without a good proportion of these half-hardy and tender climbers, twiners, and trailers. In my opinion this class of plants far excels in beauty of character, as well as disposition of the flowers, those of the bushy or shrubby classes; for while the latter can by no means be made a substitute for the climber, the climbing classes can be made to assume the character of the shrubby classes by training them on trellises suitable to the object in view. Let that be as it may, our greenhouse climbers cannot be dispensed with. It is seldom, indeed, that they get the attention they deserve, for poor miserable objects are frequently made to degrade the species.

The Cobœa Scandens (*Palemoniaceæ*).

There is no doubt that the Cobœa is one of the grandest rapid climbers we possess for lofty conservatories. Space is a great consideration in planting this climber, for it will last for many years if planted well, and if it has space in which to develop itself. The flowers are as large as an egg-cup or a wine-glass, of a fine bell shape, purple colour, and are perpetual on healthy plants, and not liable to insect pest. There is a variegated-leaved one, which is a fine acquisition to the species. The Cobœas may be propagated by seed and by cuttings.

By Seed.—Sow the seed in March in pots of fine maiden loam and leaf-mould of equal parts, and set in a mild heat. In sowing, set the seeds up edgeways, stick them into the soil instead of laying them flat, as sometimes they will rot if allowed to lie flat, instead of coming up.

By Cuttings.—Cuttings may be struck freely at any time through the summer by taking them from the young growth with two or three eyes; insert them in small pots of maiden loam and fine peat or leaf-mould, and set in a mild heat.

The Maurandya (*Scrophulariaceæ*).

There is no handsomer charactered climber than the Maurandya, both for the beauty of the foliage, disposition of the flowers, and colour. *Barclayana grandiflora* and *Atro-purpurea* are two splendid subjects of this genus. For a low wall and spaces between windows of the dwelling-house, or pillars in conservatories, nothing can surpass it. The beautiful arrangement of both foliage and flowers is extraordinary. The foliage is close and regular, and the flowers, which are deep blue, are so disposed as to show themselves to great advantage.

The propagation of this species is by seed and by cuttings. The cuttings will strike freely through the summer if inserted in small pots of fine peat, and set on a gentle heat.

By Seed.—The seed may be sown in the spring in pots or seed-pans of fine peat and maiden loam, or maiden loam and leaf-mould, adding a little sand. Set the pans of seed in a mild heat in a pit, frame, or house; pot off as soon as they are large enough to handle well.

The Lophospermum (*Scrophulariaceæ*).

This rapid climber is similar to the Maurandya, only larger as to foliage and flowers; but the flowers are not so bright. It requires about the same treatment as the

Maurandya. The propagation is the same; but it is a faster grower, and will climb over a much larger space than the Maurandya.

The Calampelis Scabra (*Bignoniaceæ*).

This is a very handsome and rapid climber, with clusters of orange and yellow trumpet-shaped small flowers of great substance. It is not a very kindly-growing plant, and requires timely care to avoid confusion; for if left to itself for a short time in the growing season it gets so confused that any attempt to disentangle it proves fatal, on account of the extreme tenderness of the young growth. It may be termed a deciduous perennial. It dies down in the late autumn, and shoots up from the root in the spring, if the stool is protected from too much wet and frost through the winter.

The propagation is by seed and by cuttings. Cuttings may be struck through the summer of the short side-shoots, inserted in fine sandy peat and maiden loam, set in a house or frame. The seed should be sown in March, in pots filled with maiden loam and leaf-mould of equal parts, and set in a mild heat till up, when the seedlings should be hardened off and set in a cold frame, and potted off before they get entangled.

The Clianthus (*Fabaceæ*).

A small genus of very rich bean-shaped flowers. There is nothing among the half-hardy dwarf climbers that can well compete with this tribe for abundance of rich-coloured flowers of great substance. This genus is a thorough warm greenhouse class, fit for flat trellises of 3 or 4 square feet super, more or less, according to the management of them. *C. Puniceus* and *Magnificus* are two which can be very easily raised from seed and grown from cuttings; but *Dampieri* is rather a peculiar subject to manage. It is very curious, but this variety is, no doubt, called *Dampieri*, from

being discovered or raised by a person of that name, the "i" being attached; yet the greatest difficulty connected with raising this variety is its disposition to damp off when the plants get 7 or 8 inches high. Whole batches will drop off by this disease in spite of all you can do. The others are not liable to this failing. The seed should be sown in the spring, in pots filled with sandy peat and maiden loam; cover the seed half an inch with soil, and set in a brisk heat.

Cuttings will strike freely in sandy peat during the summer if covered with a bell-glass. Use a bell-glass large enough to cover pot and all, plunging the pot in a tan-bed or in sawdust or cocoa-nut fibre, over a mild sweet heat over a tank. Short side-shoots are best to strike. The plants are very liable to red spider: when this is seen, at once give them a syringing with a clean solution of some insecticide.

The Loasa (*Loasaceæ*).

This is a genus but little known or seen, yet it possesses a class of splendid dwarf climbers for the greenhouse. *Loasa Aurantiaca* is scarcely ever without flowers, which are of an orange colour and of a peculiar and handsome form. They may be raised from seed annually, or propagated by cuttings of the stiff young wood during the summer. Sow the seed in March, in pots or seed-pans filled with leaf-mould and maiden loam and some sand, and set the pans or pots containing the seed in a mild heat until it is up, when air must be given, and, finally, set the seedlings in a greenhouse or pit. Pot them off, as soon as they can be well handled, into small pots first, and soon shift them into 5-inch pots, and place a stick or trellis to them; or one plant may be planted against a pillar in the greenhouse.

The Kennedya (*Fabaceæ*).

So called from the name of a man. This beautiful tribe has various-coloured pea-shaped flowers. They

are of rapid growth, and are fitted for large trellis pot work, for pillars and trellises in the conservatory, and for training over baskets, &c. They are rather liable to the attacks of the red spider, and should, therefore, be frequently syringed.

The *Kennedya* may be propagated by seed and by cuttings of the firm young side-shoots during the summer, put into small pots of fine peat, and placed in a gentle heat. By seed:—Sow the seed in March or April, in pots of peat and maiden loam. Cover it half an inch, and set the pot in a brisk heat till it is up, then give it air; pot the young seedlings off as soon as they are 3 or 4 inches high.

The Sollya (*Pittosporaceæ*).

A tribe of dwarf climbers, named after a man, having very pretty salver-shaped flowers of a bright blue. They are evergreen, are free to flower, and are good, tough greenhouse subjects for growing in pots or on trellises to form a thin sunshade trained flat, to set along the sunny side for screens during the summer, or to train at the back of the conservatory.

They are propagated by seed and by cuttings. Sow the seed in March or April, in pots filled with fine sandy peat and maiden loam of equal parts, and set in a mild heat till well up, when air must be given; and in the course of a fortnight set them in a cooler pit, frame, or house. Pot the seedlings off as soon as they are 2 or 3 inches high. Cuttings may be readily struck by selecting the young side-shoots in the spring, 2 inches long, and inserting them in pots of fine peat soil and sand, plunged in a mild heat; or by setting a bell-glass over them in a window or greenhouse.

The Hoya (*Asclepiadaceæ*).

This is named after a man, and is a small genus of slow climbers. They are very thick foliaged—*i.e.* the leaf is of great substance. Some of them

are fine subjects for the warm conservatory, and others form splendid objects on the roof of the hothouse; others being well adapted for suspension baskets for the warm greenhouse and stove. The old *Hoya carnosa* will do very well in the common greenhouse, or even in a window; I have grown it well in both places. The flowers are of a remarkably waxy substance, and last a long time, producing honey to such an extent that it even drops clear from the flowers. The same footstalks of the trusses produce flowers two or three successive seasons; therefore do not cut them off. The propagation of this species is by cuttings of the sound young growth—one or two buds or leaflets will grow—either will do, or even a leaf will strike root. Insert either in pots of peat and maiden soil, and plunge the pots in a moist heat of 60°.

The Tacsonia (*Passifloraceæ*).

This is a subdivision of the *Passiflora* tribe. The genus are subjects of the warm greenhouse or hothouse. In the cold counties the latter is safest for them, but in the mild western counties they do well in common conservatories, where they may be seen displaying their beautiful flowers suspended from the roofs of these glass houses.

Their propagation is by seed and by cuttings. The seed should be sown in the spring, in pots filled with sandy peat, leaf-mould, and maiden loam of about equal parts.

For Cuttings:—Put a good drainage first, then fill the pot up to the rim with the above soil. Insert the cuttings (three or four) in a 3-inch pot, water, and plunge it in a bottom heat of 55° or 60°; when struck, pot off at once, and grow them on a trellis, or plant them in good peat and maiden loam against pillars in the conservatory, and train them over the roof. They may also be grown on globe open wire trellises in pots so as to show the flowers in suspension.

The Tropæolum (*Tropæolaceæ*).

This is a class of plant too well known to require description here, but as we rarely see so much of some of the best specimens of this family as we could wish, I think it not out of place to say a few words in reference to them. There is that unique little dwarf climber *Jarrattii*, which has no equal as a greenhouse plant when well grown. Here I beg to caution the reader against a mistake which frequently occurs. *Jarrattii* and *Tricolorum* are two different things in character, although the flowers are so much alike that few, if any, can discover the difference. But *Jarrattii* has a nearly round tuber, and flowers much more freely, while *Tricolorum* has a thin finger-like tuber, and flowers very shyly. Some of the roots will not flower at all, yet *Tricolorum* is frequently sent out for *Jarrattii*. There is nothing among dwarf climbers to equal *Jarrattii* trained on a fine wire, salver-shaped trellis of about the size of a small cinder-sieve. The trellis should be set in the pot so as to lean over a bit, then the flowers will hang on the under side of the dishing trellis.

The propagation of the *Tropæolums* is by seed, by layers, and in some cases by cuttings. The seed should be sown in the spring, in pots filled with peat and maiden loam of equal parts, and set in a mild heat. *Jarrattii, Tricolorum, Polyphyllum, Pentaphyllum*, &c., may be propagated by laying the vines on a bed of fine peat and leaf-mould in a frame during the summer. Bury the joints of the vines by laying a handful of the fine-sifted soil on each alternate joint; shade for a few days, and keep the soil a little damp; give air; thus little bulblets will be formed in the course of the summer, which, by the end of August or September, may be taken off and kept in dry clean sand. Cuttings may be struck of the perennial and annual kinds which are not bulbous, such as *Lobbianum, Triomphe de Gand*, and *Lilli Schmidt*, &c. They should be of the short-jointed side stuff, inserted in pots filled with peat and maiden loam, and set in a mild heat till they have struck root.

The Thunbergia (*Acanthaceæ*).

The name of a man. This is no doubt one of the most beautiful tribes of dwarf climbing plants we possess. I know of no class of dwarf climbers more beautiful when well grown. Some object to them on account of their being subject to the red spider, but I was never much troubled in this way in growing *Thunbergias*. They possess every shade of rich colour from white to blue. *Aurantiaca* is orange; *Alata* yellow; *Alba* white; *Chrysops* blue; *Coccinea* scarlet.

They may be propagated by seed sown in the spring, in pots of maiden loam, dung, and leaf-mould. Bury the seed half an inch, and set the pots containing it in a brisk bottom heat; pot off soon, and grow fast, frequently syringing them. Train the plants on trellises, and give abundance of water, with a weekly watering of liquid manure. Cuttings may be easily struck from the side-shoots, inserted in pots filled with peat soil, and set in heat. They require a warm house through the winter.

The Plumbago (*Plumbaginaceæ*).

These are not proper climbers, but as *P. capensis* is well adapted for covering a trellis, I have ventured to bring it in under this head. This variety has trusses of beautiful light blue flowers at the end of every young growth. The plant is wood, and of moderately fast growth during the summer, or in a warm greenhouse. It answers well for training at the back of a conservatory to cover the walls, or on a pillar, or in a 7 or 8-inch pot, grown in peat and maiden loam. Frequently stopped when young, it soon makes a fine specimen.

The propagation of this species is by cuttings of the short side-shoots half ripe, inserted in sandy peat, and plunged in a very mild heat. The herbaceous kinds are propagated by division of the root as well as by cuttings. The old wood will strike root in a very sandy soil, and if covered with a glass.

The Lapageria (*Philesiaceæ*).

This is a remarkably fine herbaceous climber, with splendid bell-shaped flowers of a good substance, and in great abundance. It requires a cool conservatory or greenhouse. *L. rosea* and *alba* are two fine plants of great value for globe trellis-work, for large specimens. Without doubt these are the two most valuable climbing plants we possess for the conservatory. The propagation of them consists in striking cuttings of the firm young wood during the growing season, in pots of fine peat and maiden loam, with a gentle bottom heat.

The Ipomœa (*Convolvulaceæ*).

This is a slight remove from the Convolvulus. *I. Learii* is a splendid rapid greenhouse climber, fit for training on the roof, which it will soon cover, if of a moderate-sized house, so that it will afford a most desirable summer shade for other plants, and where it will develop its beautiful dark blue flowers to advantage. It is an herbaceous perennial. The tribe consists of annuals and perennials. The annuals must be sown every year. The perennials are propagated by cuttings, or by division of the roots, as well as by seed.

The Habrothamnus (*Solanaceæ*).

This is a most extraordinary flowering plant, not exactly a climber, but a fast grower. It is well adapted for growing at the back of a conservatory, where it will display its large clusters of carmine flowers to advantage. This chiefly relates to *elegans;* but there are many others, some with rose and some with purple flowers. The species require peat and maiden loam to grow them well.

Their propagation consists in raising them from seed, and by cuttings. The seed should be sown in pots of fine peat and maiden loam in the month of March, and set in a mild heat. Cover the seed moderately with fine

sandy soil. Cuttings will strike freely. Take the side-shoots 3 or 4 inches long during the early summer, and insert them in pots filled with the above-named soil, and set them in a mild heat till they have struck root, when a common greenhouse will do for them.

If they are to be grown in pots for specimens, they may be trained on a tall cylindrical trellis, or they may be made to assume a bushy character by frequent stopping, omitting this after midsummer so as to give time for numerous short growths of wood, on which will come the flowers next season in great abundance, forming a magnificent plant. There is a splendid variegated kind of great beauty to be had for this purpose.

The Abutilon (*Malvaceæ*).

These are not climbers, but fast-growing greenhouse shrubs, well suited for covering pillars and trellises. Indeed, I know of few plants better suited for the purpose, or possessed of more beauty in this respect, than this tribe, on account of their ample foliage, their freedom of growth, and the beauty of their large, pendulous, cup-shaped flowers. These latter have rich markings of crimson on a soft white ground; and again, yellow and blue markings, orange and red, &c. They may be grown as bushy shrubs, and will soon form fine specimens by frequent stopping during the growing season.

The propagation of the Abutilons may be by sowing the seed in pans filled with fine peat, leaf-mould, and maiden loam of equal parts. Put a good drainage, then some rough siftings over them, fill the pan firmly, make even, and sow the seed thinly over the surface, and cover it as thick as a shilling; set in a frame or heated pit.

By Cuttings.—Take cuttings of the firm side-shoots with short joints, trim off the leaves below, make a clean cut at the base, and insert them around a 4-inch pot filled with fine sandy peat; water, and plunge the

pot in a tan-bed, over a warm tank, or in a hotbed frame with a mild heat.

The Dolichos (*Fabaceæ*).

A curious class of bean-shaped flowered plants, not much grown. They are propagated by seed sown in pots, set in heat, and by cuttings in sandy peat, placed on heat.

The Dipladenia (*Apocynaceæ*).

This is generally classed among our stove climbers, but I have grown *Crassinoda* in a warm greenhouse well. It is a beautiful dwarf climber, and there are some improved varieties of this genus now; *D. Williamsii* is one of them.

They are all splendid plants for training on globe trellises, but they require a thoroughly good drainage, and should be grown in rough peat with some good maiden loam, and be very sparingly watered during the dull winter months. Their propagation is by cuttings of the short side-shoots during the summer months. Insert them in pots filled with pure sandy fine peat, and plunged in a sweet mild heat under a large bell-glass.

The Clematis (*Ranunculaceæ*).

Sieboldii is one of the finest greenhouse varieties we have; it is a very nice grower, and a free flowerer. It will flower in the most beautiful order all along the new growth at every leaflet. The flowers are white, with a clear purple centre. The propagation of the Clematis is referred to at page 73.

BOOK V.

THE PROPAGATION AND USES OF GREEN-HOUSE PLANTS.

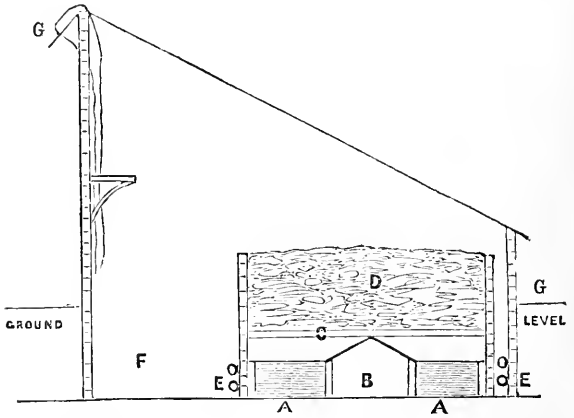

Fig. 22.—End Section of Cucumber Pit and Propagating House for the Profession.

Reference to Plan.—A A, tank, flow and return; B, chamber in which rhubarb may be forced; C, floor in which the bed or plunging material rests; D, bed, &c.; E E, flow and return pipes; F, pathway; G G, ventilators.

This class of house is adapted for the propagation of all classes of plants to any extent; and also for the forcing of flowers, cucumbers, &c. It is admirably adapted for cold counties, being completely under control in severe weather.

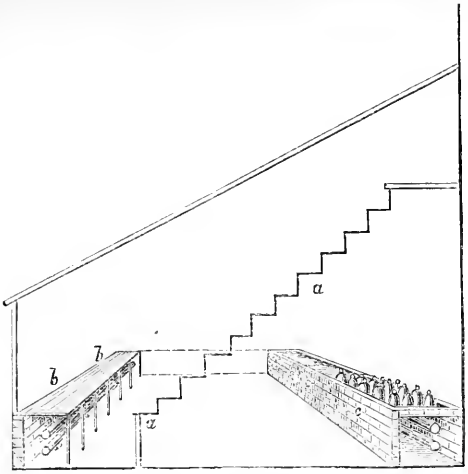

Fig. 23. End section.

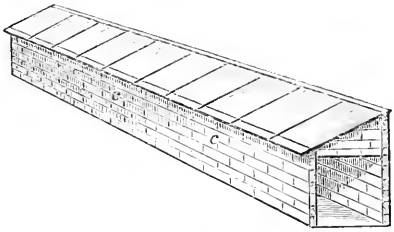

Fig. 24.

THE AMATEUR'S PLANT AND PROPAGATING HOUSE.

REFERENCE TO PLAN.—*a a*, section of staging; *b b*, stage along the front of house; *c c*, propagating-pit at the back of house, with pipes to heat it. Fig. 24, *c c*, the propagating-pit, with small open-and-shut sashes. This house will be found one of the most useful and convenient kind for small professionals, and for all amateurs.

THE CHOROZEMA (*Fabaceæ*).

THESE are among our choicest greenhouse shrubs, and as they are comparatively easy to grow to great perfection, it is quite marvellous to find so few of them in our villa conservatories. There is no plant, or class of

plants, more deserving of general cultivation than the Chorozemas. They are capable of assuming, by timely stopping, a beautiful, compact, symmetrical form, specially suited for exhibition, being of a robust, stiff character, and carrying a multitude of handsome pea-shaped flowers, which are, as a rule, orange and red, yellow and red, or scarlet and yellow; nor can any plant be matched with these as cut flowers.

They should be grown in peat soil, with sand, and one part fibrous loam. The species is propagated by seed and by cuttings.

By Seed.—Sow the seed, which is small, on the surface of seed-pans filled with sandy fine peat and sifted maiden loam of equal parts. First insure a good drainage with crocks, then put a good layer of siftings over these; fill the pans up to within half an inch of the rim, and press the soil firmly in, so as to make a smooth surface, and then sow the seed evenly over it,

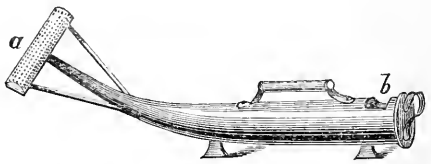

Fig. 25.—The dewpot, or irrigator. This utensil is one of the most useful implements a garden can possess for watering beds and pans containing fine seeds, and the foliage of plants. The jet, *a*, is full of holes as small as a needle point, so that the water emitted from them is as fine as the smallest rain, like dew; *b*, an opening to admit of pouring in water to fill the pot. The implement should be made of good light copper or zinc, but the jet should be of copper or brass.

covering it one-eighth of an inch with fine soil, and set the pan in a warm pit or frame or propagating-house. Lay a square of flat glass over the pan till the seed is up, when air must be freely admitted to the young seedlings. Give tepid water sparingly with the "dewpot," or a very fine rose water-pot; let the glass remain off for an hour or two to dry the young plants, and remove it altogether as soon as the seedlings

are well up. Pot off as soon as the young plants have four or five leaves.

By Cuttings.—Take short side-shoots of the firm young wood at any time during the summer; trim them clean at the base with a keen-edged small knife, and insert them, in small pots half an inch apart, in soil composed of half fine sandy peat and half maiden loam and silver sand, insuring a good drainage first by filling the pot with fine broken potsherds, one-third full, with some fine cracked-up charcoal over them. Then fill the pot well up to the rim quite firm, insert the cuttings, and close the soil well to the base of them, and water them with a fine rose water-pot. Dry them for an hour, and put a bell-glass over them—one that will fit inside the rim of the pot—and set them in a mild bottom heat, not in a hotbed frame (that would be too damp), but in a propagating-house, in sand, over a good tank. The glasses must be taken off every morning, wiped dry, and put on again immediately till the cuttings have struck root, which will be known

Fig. 26.

Fig. 27.

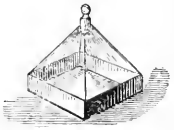

Fig. 28.

Fig. 26 shows the manner of placing a bell-glass over some pots of the cuttings referred to in this work.

Fig. 27 shows the manner of placing a small bell-glass over a pot of the cuttings referred to throughout this book.

Fig. 28.—A new class of handlight, easy of construction and cheap.

by their making new growth; then the glasses may be taken off, and a large bell-glass set over the pot for a few days or a week, admitting air either at the top or below.

The Leucopogon (*Epacridaceæ*).

L. Cunninghamii is a good specimen of this genus. This shrub is a most useful and beautiful subject for

the greenhouse, and should be in the possession of every one who has a good house, as it bears numerous small and beautiful waxy white spikes of flowers, admirably suited for small hand bouquets or the buttonhole. It is quite a ladies' flower, superior to the Heaths or the Epacris for this purpose, and equal to the Lily of the Valley, except in fragrance.

This plant should be grown in good peat, and stimulated after it has done flowering (which is in the spring) by stopping the young growth at an early stage, so as to induce a bushy habit and to form a good specimen, as well as to get a full crop of flowers the ensuing season. It is easy to grow, and not at all subject to insect pests or disease.

Its propagation is effected in the same manner as for the Chorozema, but the cuttings must not be of wood more than half ripe, or they will not strike; the fully ripe wood gets very hard.

The Epacris (*Epacridaceæ*).

The Epacrises are too well known to require any detailed description here. Suffice it to say that there is no better tribe of greenhouse plants to be found for growing as large specimens, and they require comparatively little care beyond the frequent stopping of the young growth up to July or even August; this will insure plants full of short spikes of flower. They require good sandy peat soil, a sound drainage, good-sized pots, and a liberal supply of water during the summer.

Their propagation consists in taking cuttings of the firm young wood, but not at all ripened; they should be not more than two inches long, and of the medium growth. Trim them carefully with a pair of propagating-scissors, divesting the cutting of the leaves halfway up from the base, and with a fine-edged small knife cut the base of it at right angles, making a very clean cut; and then insert five or six of them in a large 60-size pot, leaving room enough next the pot for a small bell-glass to go over them, and which

should be just as large as the pot is inside. The pot must be well drained, and filled with fine peat one part, and silver sand one part; give water, dry, and put the glass on, and set in a mild heat as for Chorozema, &c.

The Heath (*Ericaceæ*).

There is nothing, as a genus among plants, that contains so much diversified beauty as the Heaths; but there is one drawback to the general culture of this lovely tribe, and that is, no person can grow them among other plants. The Heath must have a department specially for itself in order to insure success. The reason is, not that they are more tender or so tender as the Geranium or Fuchsia, but they will neither endure fluctuations nor the atmosphere which a general collection of plants frequently must induce.

The Heath does not require a high temperature, but a very even one, and the most uniform treatment possible, both as regards water and air. I wish particularly to impress on the minds of my readers the nature of the greenhouse Heaths, and the difficulty that even good gardeners find in succeeding at all in growing them in the same house as any ordinary collection of plants—such as Geraniums, Fuchsias, &c.; so that no amateur can possibly expect success without a good pit or house on purpose for them. I do this to prevent disappointment, as they may be frequently told by some sellers of Heaths that they will grow in any common greenhouse with other plants; but I say they are sure to fail ultimately. I recommend a good dry span-roof pit, or a low house with just as much heating power as will exclude frost, and no more. Covering up with mats is far better than a fire heat; still, a sufficiency of hot piping in the house or pit to dry off damp is necessary. Give abundance of air daily, and always be careful to maintain the root in a fair state of moisture, but not over-wet, nor ever quite dry, for if a Heath once gets thoroughly dry through the root it is sure to prove fatal. On the other hand, to super-

saturate the root with water—*i.e.* to continue giving water when it is already damp enough—will be sure to prove fatal also.

The young plants should be frequently stopped to induce a dwarf and bushy nature. All the Heaths require a pure, sandy, fine peat.

The propagation of Heaths is by seed and by cuttings.

By seed some new sorts will, no doubt, arise. The seed is very fine, and requires care to raise plants from it. The seed-pan in which you mean to sow it must be well drained first, then fill it up to within half an inch of the rim with fine sandy peat and silver sand, one part of the latter to two parts of the former, well mixed; shake and press the soil well into the pan, so as to make it pretty firm, then with a fine rose water-pot water the soil so as to soak it through. Let it stand for an hour or two, then sow the seed evenly over the surface, and sprinkle as much very fine soil over it as will barely cover it, and place a square of flat glass over the pan till the seed is up, as we call it; place the pan in a shady part of the propagating-house.

By Cuttings.—Cuttings of the firm young growth may be struck whenever they can be had. The same methods of treatment for striking these as was recommended for the Chorozema and Epacris are equally good here. The daily wiping of the striking-glasses in this case is of much importance.

The Correa (*Rutaceæ*).

This tribe comes from New Holland. They are all pretty, dwarf, stiff-growing shrubs, very free to flower, and not at all difficult to grow. Any ordinary culture will grow them, and any common greenhouse will suit them; some little stopping at an early stage in the growth of the young plant will induce a dwarf habit, and form a handsome specimen; peat and maiden loam of equal parts will grow them well.

The propagation of this species is chiefly by cuttings. Take cuttings of the half-ripe young wood, make a clean cut at the base, and insert them (five or six) in a 4-inch pot filled with fine sandy peat; water, and place a bell-glass over them, and plunge in a mild bottom heat as for the Leucopogon, &c. The Corræas may be raised from seed, when it can be had, by the same treatment as for the Chorozema. Grafting is sometimes resorted to with some difficult sorts, using the common *Alba*, *Virens*, &c.

The Orange.

The raising of Orange-trees is a very interesting art in horticulture. The seed should be sown in the spring, in deep seed-pans, or in pots filled with sandy peat and maiden loam. Cover it from 1 to 2 inches with the soil, and plunge the pots in a good mild heat; keep the seed moderately moist and close, when it will soon come up. Pot off as soon as the seedlings are 3 inches high, and plunge the pots in a mild heat. When the seedlings are as large in the stem as that of a common tobacco-pipe, graft them with any desirable sort. Do the grafting close to the top of the pot, and tie the grafts on well, using some grafting-wax over the ties, and then plunge the pot into a mild heat over the union, when they will soon unite. Shift the plants as soon as the grafts have made a little growth, continue the young plants in a close pit or house, and give liquid manure frequently, when fine plants will soon be the result.

The soil in which to grow the Orange well must be one part good peat, one part maiden loam, and one part old decayed manure.

By Cuttings.—Take half-ripened young wood whenever it can be had, trim them as usual, and insert them (four or five) in a 4-inch pot, of peat one part, and silver sand one part, and plunge the pots up to the rims in a mild bottom heat, and set a handlight over them.

The Acacia (*Fabaceæ*).

The tribe of Acacias is, in many instances, a noble class of fine-foliaged as well as flowering plants. Many of them assume somewhat of the character of Ferns, and persons sometimes say to me, "What fine ferns!" referring to some specimens of *Lophantha*. This variety has very fern-like foliage, and when well grown forms a fine feature in a conservatory, or even a good large window. *A. longifolia* is a very free-flowering species, differing from *Lophantha* in foliage as well as in its flowers. The old "Soldier's Bush," as it has been called, or *Armata*, is a general favourite, and well deserves its place.

The propagation of the Acacias consists in raising most of them from seed, although some are raised from cuttings. *Armata* should be always multiplied by cuttings of the short side-shoots, trimmed neatly, and the base of them cut clean with a fine-edged knife, and inserted in pots filled with one part fine peat, and one part clean sand. First put a good drainage at the bottom of the pot, then fill well up to the rim of it with the soil, and make it firm; then insert the cuttings, one inch apart, all over the pot, leaving room enough between the inside of the pot and the cuttings for a striking-glass to go over them.

After the cuttings are in, give them water with a fine rose water-pot, so as to soak the soil through; let them dry, and place the glass over them, and plunge the pot or pots up to the rim in a warm tank or plunging trough over hot-water pipes, in clean sand, sawdust, tan, or cocoa-nut fibre; wipe the glasses once or twice a week, as for the Heath, &c.

By Seed.—Sow the seed in the spring in a brisk heat. It is a good plan first to soak it in hot water for twelve hours; then sow it in peat and sand of equal parts, and cover it one inch. Plunge the pots in a brisk heat till the seed is up, when they may be lifted and set above, and finally placed in the warm greenhouse, and potted off soon afterwards.

The Leschenaultia (*Goodeniaceæ*).

This New Holland plant is named after Leschenault, a Frenchman. It is a tribe of the most beautiful dwarf recumbent plants we possess. To obtain well-grown specimens of a healthy, symmetrical character, begin with young plants. They will strike freely from cuttings of the young growth inserted in pots filled with fine sandy peat, put under a large bell-glass, and set in some shady part of the propagating-house or greenhouse during the summer months. Pot the young plants off as soon as they are fairly rooted, using small pots at first, and stop the points of every shoot as soon as they are an inch or two long. Continue to do this as they advance, and by shifting them from one pot to the next size up to 8-inch pots, using good sandy peat, fine symmetrical specimens, fit for any first-class conservatory or floral exhibition, will be the result. These are comparatively easy to grow in any good ordinary greenhouse, and no one possessing such a house should be without *Leschenaultias*, for there can be no plants possessing better characteristics than they do for handsome, Heath-like foliage, and which cover the pots as well as the plants themselves with flowers of scarlet, blue, or yellow. *Formosa* is a perfect gem.

The Pimelea (*Thymelaceæ*).

The *Pimeleas* are a well-known genus of choice greenhouse dwarf shrubs, with white, pink, or blush-coloured waxy heads of flowers. They are evergreen, very free to flower, and not at all difficult to grow. For cut flowers no better class can be grown, as the plants will bear cutting to any extent without the least disadvantage to them. On the contrary, cutting all the flowers off, with a good bit of the plant, will improve the habit of it by keeping it back, as the flowers are rather disposed to run to the extremities, and the plant to get deficient in foliage below. *P. Spectabilis* is as good as any, and should be in every

greenhouse. It delights in good sandy peat one part, and maiden loam one part; both should be merely chopped up with the spade, but not sifted. Use good drainage in the pot, and mix some broken charcoal among the compost.

The plants may be propagated by cuttings and by seed, but as they will grow from cuttings freely, it is not necessary to sow seed. Select the firm young wood during the spring and early summer months; trim the cuttings neatly at the base, and clip the leaves off them half-way up, and then insert them in pots firmly filled with fine sandy peat, using a good proportion of sand. Water them, and place a bell-glass over them, and set the pots in a shady part of the greenhouse or propagating-house to strike; pot off as soon as they are well rooted, stop the points of the shoots, and continue the plants in the greenhouse.

The Kalosanthes (*Crassulaceæ*).

This is a tribe of plants possessed of an enduring constitution under heat and drought. *Crassulaceæ* means "thick-leaved," and that is all, so that it conveys no idea as to the characteristics of the flower. But the present genus possesses flowers of great beauty and substance. *Kalosanthes miniata* is one of the grandest-flowering varieties we possess. In well-grown and large specimens it forms an object worth seeing, with its numerous heads of scarlet flowers, which are of great substance and of long duration, being fragrant also. Young plants should be stopped, to induce dwarf and finely formed specimens; when in flower they look well, but a plant three or four years old forms a still finer feature when in full flower.

The propagation of this species is by cuttings, by seed, and by offsets; but that of *K. miniata* and its allies is by cuttings of old or young growth, whichever may be most convenient. After a plant has done flowering, immediately cut it back, and put the cuttings into pots filled with sandy peat and maiden loam;

cuttings three inches long are quite enough. Insert them half-way in the soil, and plunge the pots containing them up to the rims in plunging material of some kind over a warm tank, or in a propagating-pit over hot-water pipes, &c. Give water sparingly at first. The old cut-back plant should be subjected to a good lively heat, and have an abundance of water, to induce a free young growth for flowering the following season.

The Begonia (*Begoniaceæ*).

This is a genus too well known to require much detailed description here; but being a splendid as well as a useful class of plant (although comparatively so few of them are to be seen in common greenhouses or windows, for which they are admirably suited), I may venture to make a few remarks upon them.

This genus is no doubt one of the most diversified in character of any we possess, as subjects of the stove and greenhouse. We have two distinct classes of it, viz. the bulbous and the evergreen shrubby class. *B. Fuchsioides* and *B. Rex* may be taken as two extreme types of the shrubby class, and *B. Sedenii* as a type of the bulbous class. Each of these divisions possesses numerous varieties, all of which are beautiful in the extreme, either as regards their foliage or their flowers. Nothing can surpass a well-grown specimen of *B. Rex*, with its large zebra-like marked leaves. The same may be said of *B. Fuchsioides*. Nor can any plant or class of plants equal a well-grown *B. Sedenii*. Strong bulbs of this variety may be easily grown into specimens 3 feet in diameter and 3 feet high, as full of large crimson flowers as any scarlet Tom Thumb Geranium can possibly produce.

The Begonias are easy to grow, and will continue in flower for many months. The bulbous classes die down in the autumn, when the bulbs must be kept dry during the winter season, but they may remain in the same pots, and be started into growth in the spring in a mild heat. Give no water, or but very little, until signs

of growth appear, and as soon as the bulbs have made an inch or two of growth, repot them, using the same pots. Take the bulbs out, and shake most of the soil from them; put a good drainage at the bottom, and some rough peat and rough turfy maiden loam mixed over the crocks, and then fill up with the same compost, the fine mixed with it, but not sifted. Place the bulbs in the pots, and fill in all round up to the top of the pots, and set them in a warm greenhouse. All the shoots may be removed from the crown of the bulbs, except one or two, and each crown shoot may be potted singly for plants. Give a moderate quantity of water, with a weekly watering of liquid manure, all through the growing season, and I am sure there is no plant nor class of plants that will better repay the small amount of trouble.

The Shrubby Begonias.—*B. Rex* is a remarkable plant for splendid foliage. It is easy to grow in any ordinary warm greenhouse, in large pots of rough peat and maiden loam, with some decayed manure. It may be propagated by cuttings of the stems or by the leaves, inserting them in pots of fine peat, and set in a mild heat. *Fuchsioides* and its class require a warm greenhouse or a stove in winter. All the shrubby class are propagated by cuttings of the firm young growth during the spring or summer. Most of the Begonias can also be raised from seed sown in seed-pans filled with fine peat and maiden soil and leaf-mould in the spring, and set in a mild heat. The seed is very fine, and should have a flat square of glass laid on the pan to prevent the soil drying till the seed is up.

The Cineraria (*Asteraceæ*).

This is an extraordinary free-flowering class of plants, and is also most showy in the display of its flowers. In their natural state they possess a rich yellow as their prevailing colour; every one knows the English variety, displaying its bright golden-yellow flowers in large heads in the open fields and in the hedges during

the month of June. The florists' varieties have now arrived at a pitch of perfection never before known. The flowers have attained to a size and character that can scarcely be excelled. There is no flower more accommodating than the Cineraria: nor can a substitute for it be found for display during the early spring months.

The propagation of it consists in raising it from seed, and by offsets or young side crown shoots which arise from the old plants after flowering. These are taken off with the knife, with a small quantity of root if possible, and at once potted into small 60-size pots, using a compost of two parts of decayed leaf-mould, or pulverised hotbed manure, and one part of maiden soil, mixed together and sifted through a ⅜-mesh sieve. Pot the offsets well, and set the pots in a cold frame facing the north. Shade them in the middle of the day, and keep them close for a week or a fortnight. Water them well at the first potting, and slightly sprinkle them with a fine rose every evening at four o'clock. When these pots are filled with root, shift the plants into small 48-size pots, set them in the frame, and give abundance of air day and night, and continue the sprinkling overhead every evening. As soon as these pots are filled with root, shift them into 32-size (6-inch) pots, and set them out of doors under a north wall, and continue the sprinkling overhead daily if the weather is dry. If large plants are wished for, shift the plants from these pots into 8-inch.

By Seed.—Sow the seed under a handlight in a shady spot in June—or May, if early plants are wanted. Choose the spot, and prepare a bed (with the same kind of soil as recommended for the offsets) 2 inches thick, press the soil down firmly, make quite even, and then water the bed: let it remain for a few minutes, then sow the seed evenly over the surface, sprinkling as much fine soil over it as will just cover it, and put the light on. Keep it close, and the seed will soon vegetate. When the plants are possessed of four leaves

give them air. Pot off as soon as they can be handled well, and treat them as for the offsets before referred to. In all cases house the Cinerarias as soon as there is danger of frost, but use no more fire than is necessary to exclude the frost, and continue the syringing daily.

The Calceolaria (*Scrophulariaceæ*).

Many declare that the Calceolaria is so difficult to grow that they are obliged to abandon the cultivation of it altogether; but I must say I cannot understand this, for I have grown it for many years, and I never found it a difficult matter. Too much coddling and nursing is, I am convinced, the chief cause of failure. The herbaceous Calceolarias must be raised annually from seed; the shrubby kinds are propagated by cuttings.

Sow the seed in May in a seed-pan filled with fine-sifted maiden loam and good leaf-mould of equal parts, with some silver sand added. Well drain the pan by covering the crocks with a layer of rough siftings of the above compost; then fill up with the fine compost (an inch of this will do). Make it firm and even, then water the soil so as to soak it fairly, and sow the seed at once, sprinkling as much clean silver sand over the surface as will barely cover it, and no more. Lay a flat square of glass over the pan, and set it in a cold frame or in the shady part of the greenhouse, where very little or no sun can come to it. No water will be required till the seed is up, when air must be admitted; pot off as soon as the plants can be handled well, and set them in a cold frame facing the north, and continue them in the cold frame, giving an abundance of air night and day all through the summer months.

By the month of September shift the plants into 5-inch (48) size pots, and place them in a deep pit as soon as any danger of frost arises. Here they should remain all the winter to protect them. In March shift them into their flowering-pots (6-inch), and continue

them in the cold pit; in April remove them into the house for flowering. By this treatment no one will be much troubled with insect pest, the universal drawback to growing the Calceolaria.

Shrubby Calceolarias.—These are propagated by cuttings in September, short young side-shoots taken off, trimmed, and inserted either in pots filled with sandy maiden soil or under handlights in a shady place, and kept moist. Again in the early spring the tops may be taken off and inserted in pots, and placed in a mild heat.

The Geranium.

A great deal has been written upon the propagation and cultivation of the Geranium, which may be condensed into a few words. Some of the species are certainly more difficult to strike from cuttings than others; but, as a rule, the Geranium will strike freely from cuttings, if taken off and inserted in a prepared bed on an open border facing the south, well closed at the base of the cutting, and kept well watered. A small amount of shade may be afforded them for a week, just to break off the mid-day sun only. They will strike roots much better this way than by over-nursing them; or many of the more robust sorts will strike root well if merely inserted in a shady border of any good common soil during the summer months. This applies to both the fancy and the scarlet classes; the "Tricolours" are an exception, for they seem to require heat in order to grow well.

The successful growing of the fancy Geranium may be summed up thus:—Get the young plants potted up by September in small 48-size pots, stop them at once, and every succeeding shoot after, up to February or March. Keep the plants in an airy, light, and cool house, and give them no more water through the winter than will just keep them going, and no more fire heat than will exclude frost. Keep down insect pest by fumigating as soon as anything of the kind appears, shift the plants into their blooming-pots in March, and

tie out the branches early. This is the whole matter in principle and practice to insure success. They should be grown in one-half good tender maiden soil and one-half decomposed hotbed manure, well incorporated, chopped fine with the spade, but never sifted.

The Fuchsia (*Onagraceæ*).

The propagation of the Fuchsia is very easy, and the attainment of a large and well-formed specimen equally so. Take short cuttings of the young wood in February, or early in March; two joints are enough. Make a clean cut below the joint, and insert them in pots filled up to the rim firmly with one part good maiden soil, and one part peat or decomposed leaf-mould or manure sifted fine. Close the soil well to the base of the cuttings, give them water, and plunge the pots in a mild heat. Pot off as soon as they are rooted, using rough compost (not sifted); set the plants in a light, warm house, and give air as opportunities offer daily. Give plenty of water, and train the leader to a straight stick, and by August and September specimens will be formed at least 3 feet high, with laterals from the base up to the top, within a few inches, each of which will be well ornamented with flowers, forming a pyramid.

New sorts may be obtained from seed, which should be sown in March in pots, and set in heat. Old plants are scarcely worth saving, as young and fine ones can be so easily obtained from cuttings every season; and besides, they never form such good plants as the young ones.

The Erythrina (*Fabaceæ*).

Without doubt this genus may be considered one of the grandest and most conspicuous flowering subjects we possess. It is somewhat of a marvel to me that so little of it is to be found in our gardens. Gardens I say, because some of them will do well in sheltered places in the open ground. However, to insure complete success, it should be afforded a cool house. It possesses

the most peculiar as well as the richest colouring in the flower. *E. Crista-galli*, or "cock's-comb," resembles a comb in shape as well as in colour. This variety should be planted at the foot of a front or south wall of a dwelling-house, and nailed to it, where it will do well, if it is planted in rough peat and manure, and has a good drainage. It will die down every autumn unless the summer's growth can be so far ripened as to endure the winter by covering it up—which, however, is not at all likely in this fickle climate.

The *Erythrina* is a native of the Brazils, South America, and the East and West Indies. In its native air, which of course is one of constant heat, and which drives vegetation along amazingly fast, it attains to the height of 30 or 40 feet, but this can never be expected in England.

The propagation of the *Erythrina* is by seed, and by cuttings from the crown shoots. An old crown or root will throw up a number of shoots in the spring, and as soon as these are 2 or 3 inches long, take all of them off except one or two, with a sharp knife, with a good heel of the old wood. Trim these cuttings at the base, and insert them in pots filled with sandy peat, and plunge the pots in a mild heat.

By Seed.—The seed of the *Erythrina* is very hard, and should be soaked in warm water for a few hours previous to sowing. Then sow it in fine sandy peat, covering it 1 inch, and plunge the pots in a brisk bottom heat. Pot off as soon as the seedlings can be handled well. These seedlings will not flower under three or four years.

The Bouvardia (*Cinchonaceæ*).

This is comparatively little known among amateurs, except in bouquets, where it is admired for its exquisite beauty and delicacy of tint. Why this genus is so little grown I cannot tell. It cannot be on account of its fickle disposition, or tenderness, nor for want of beauty as a greenhouse plant, for a well-grown old

plant forms an object worthy of a good house. Some use it for beds, but upon the whole it is not robust enough for this climate, nor is it of a character well adapted for this purpose.

The propagation of this genus consists in the same treatment as for the *Erythrina*, by crown cuttings inserted in fine sandy peat and fine leaf-mould, plunged in a mild bottom heat. These cuttings will soon root, when they should be potted off, using 60-sized pots, and kept in a good house, being stopped early to form bushy plants. They may also be propagated by cuttings of the roots. They should be grown moderately free, and kept clean.

The Coleus (*Lamiaceæ*).

The Coleus is properly a hothouse plant; still it may be successfully grown in any good ordinary greenhouse through the winter, if a moderate heat is kept up, and the house kept close. It is used for bedding, but it is not every season that is hot enough for it. It makes splendid specimens when grown in large pots, and if frequently stopped.

Its propagation consists in striking points of the shoots in heat in the spring, and inserting them in pots of fine peat and maiden soil of equal parts. The cuttings strike very freely.

By Seed.—The seed of the Coleus is very fine, and should be sown on the surface of a seed-pan filled with fine peat and maiden soil, and some leaf-mould. First fill the pan with the compost, make it firm, and then water the surface and sow the seed; slightly cover it with fine soil, and lay a square of flat glass over the pan, and set it in a lively heat.

Ferns (*Greenhouse*).

The greenhouse Ferns are a most useful and beautiful class. As a type of the Maiden-hair section, we may refer to *Farleyense*, evidently a variety of *Cuneatum*, and this is no doubt the *ne plus ultra* among this class.

The Maiden-hairs are all more or less a graceful species, but the *Farleyense* outstrips them in regard to this characteristic. The interest that is attached to greenhouse Fern-growing no doubt far exceeds that pertaining to all other classes of similar plants. Their various dispositions, beautiful shades of green, and the rapidity with which they develop themselves into perfect specimens by careful culture—all these excite admiration, yea, I may say affection for them beyond every other species of plant. This arises, no doubt, from the fact of their possessing the charm of being of a constant character, and in having a quiet favourable colour most agreeable to the sense of sight; having, moreover, no fluctuations like the Geranium, Fuchsia, &c., whose charm lies in their gaudy flowers only, which last but a comparatively short time.

Ferns can be grown in a common greenhouse with other plants, but to be really successful a shaded house should be devoted to them alone. Such a house should be glazed with green glass. I find that the foliage of plants assumes a much deeper green, and that they do so much better, under green glass than under white. I have lately proved this to demonstration. I had a large frame of six sashes with *Primula Sinensis*, two or three of which sashes (lights) were done over (painted) outside with light green oil paint, a fair coat. The plants that were under this coloured light assumed many shades of deeper green, and were more healthy and robust than those under the light with clear glass. Green glass is especially adapted for growing Ferns under, even more than flowering plants, for they prefer a subdued light.

The house for Fern-growing should be low, and fitted up with broad close stages. The walls may be of a rough description, so as to hold moss and *sphagnum* stuffed into the crevices; this will contain moisture, and serve to supply an atmospheric vapour by syringing daily. It will also serve as a reserve for the production of seedlings, by throwing seed over it. The fernery should have an apparatus for supplying a

moderate heat; hot-water pipes with water gutters attached to them are as good as anything.

The propagation of Ferns consists in dividing the roots, and multiplying them from seed. There appears to be no means of obtaining new varieties by fertilising the seed-producing organs, so that if new sorts arise from seed it is by a freak of nature. I think such a thing quite possible, especially with Ferns. Sow the seed at any time in the house—the autumn, perhaps, is the best for this. Propagating them from a division of the root may be done whenever offsets can be obtained. The soil for growing Ferns should be of good rough peat chopped up with the spade, turf and all, two parts, and rough maiden soil one part; good drainage and plenty of water, with a few waterings of weak liquid manure in the case of old plants.

The Gloxinia (*Gesneracea*).

Properly speaking, the Gloxinias are stove plants. They may, however, be grown successfully in a good warm greenhouse, and I have done this. It is a class of very desirable plants, possessing as it does remarkable and decided colouring in the flowers, its whole character being superb beyond description. The beautiful leaf, the dwarf and compact habit, the abundance of its rich and wonderfully varied flowers, demand for this genus a well-deserved place in every collection of good plants, whether small or great.

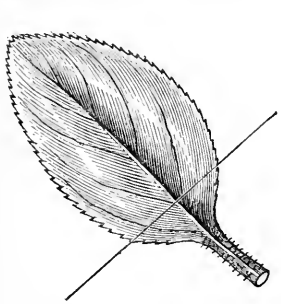

Fig. 29.—Leaf of Gloxinia cutting.
The line shows the depth to insert it in the soil.

The propagation of the Gloxinias consists in striking the leaves of them as cuttings, with a base of the petiole or footstalk of the leaf inserted a little way into the soil, half-way,

or a little less, up the leaf. The pot should be a large 60 ($3\frac{1}{2}$-inch) filled with fibrous peat and fine-sifted leaf-mould of equal parts, and carefully watered, dried a little, and then plunged in a mild bottom heat, such as a good tan-bed, and having a large bell-glass placed over pot and all. They may also be multiplied by seed sown in a seed-pan filled with sandy peat and fine leaf-mould, slightly covering the seed, which is very fine. Lay a square of flat glass over the pan, and set it in a mild heat. The bulbs must not have much water (or none at all, unless the plants are growing in a stove) through the winter. Keep them dry in the pots from the time they begin to die off until February, when they may be set in a brisk heat, and a little water given them soon after. As soon as the bulbs have broken leaf a little, shift them, shaking all the old soil from them.

The Achimenes (*Gesneraceæ*).

I am much surprised when I visit gardens to find so little, comparatively, of this splendid tribe as an inmate of the glass house. Like the Gloxinia, the Achimenes is considered a stove plant, but it can be as easily grown in a good common greenhouse with a general collection as the Fuchsia or Geranium. I have done so to a great extent, and I might, I think, have challenged all that could be found which had been reared in stoves for effect. Be that as it may, the Achimenes can be grown well year by year in an ordinary greenhouse. My way was this. I started the bulbs in a lively heat in a common hotbed with a sweet heat. I used fine-sifted leaf-mould alone, with silver sand well mixed, and put some moss at the bottom of the pans for drainage, or siftings. Then I filled the pans up with the leaf-mould and sand to within half an inch or so, placed the little *rhizomas* (bulbs) all over the surface pretty thick, and covered them with the half-inch of leaf-mould to fill the pans quite up, and set them in a heat, as I have said.

No water should be given till they begin to grow, and when 2 inches of growth have been made, I would pot them off, putting three in a 4-inch pot, and put them back for a week or fortnight. When re-established, harden them off, and shift them into larger pots, or use them at pleasure.

I used to fill wire baskets with them, having moss for the outside, and leaf-mould and moss for the inside, bedding them in, roots inward, and with the tops of the small plants through the wires. Give them a good watering, and suspend the baskets from the roof of the conservatory or greenhouse by a wire; here they will form balls of flower, and give a kind of celestial beauty to the house.

Their propagation consists in obtaining young bulbs from the root, and by seed sown as for the Gloxinia—(see page 118).

The Petunia (*Solanaceæ*).

The Petunias are too well known to require any description here; suffice it to say they make very good plants for the conservatory if they are frequently stopped, and get plenty of air and light; but they will not bear much heat and close confinement, nor a dull house. The propagation of the Petunia is by cuttings and by seed; the best plants are from cuttings. They are easily struck at any time by selecting short young growth, and inserting them in pots filled with peat, leaf-mould, and sand, and put in a mild heat in the spring, and under a handlight in the summer without heat.

By Seed.—Sow it in seed-pans in the spring, and set them in a mild heat; prick them off into other pans or pots as soon as they can be handled. I rather prefer seedlings for bedding purposes.

The Verbena (*Verbenaceæ*).

The Verbena is a most accommodating class of greenhouse plant. As a pot plant for the conservatory

nothing can surpass it, and as a bedder it no doubt excels most things, possessed as it is of every shade of colour, and having a distinct beauty of its own. This genus has now arrived at a state of perfection that probably can never be surpassed.

The propagation of the Verbena is by cuttings of the points of the young growth during the month of August for stock plants for the winter, from which cuttings may be taken again through the spring months for bedding. The cuttings strike freely in pans filled with any sharp clean sand, and kept saturated with water, in heat, in the spring, and set full in the sun without any other heat in August. These August-struck cuttings will make nice pot plants for flowering in the spring, and on through the summer in the conservatory, if grown freely, and frequently stopped. New sorts are raised from seed sown in the early autumn, or very early in the spring, so as to get them to flower in the following summer.

The Lantana (*Verbenaceæ*).

This genus has been much improved of late years. There was a time when but one or two colours were cultivated, but now we have many beautiful tints. They are well worthy of cultivation as pot plants, or for bedding, pegged down. Cuttings may be easily struck in pots of sandy peat in a similar way to that of the Verbena, except that a mild heat is necessary for them.

By Seed.—Sow the seed in pots or pans of fine peat, or leaf-mould and maiden soil, and set in heat in the early spring. As a pot plant, frequently stop the young plants, to induce a dwarf condition, and grow them slowly, or they are apt to get beyond a neat habit; but as soon as flower-buds begin to show themselves, give liquid manure; this will develop fine trusses of flower.

The Solanum (*Solanaceæ*).

The Solanums have now become quite prominent articles of commerce as decorative subjects, and many pretty dwarf varieties are the result of hybridization. I find it a useful plan to put the young plants out into a good bed in a sunny spot in the month of May. If they are struck from cuttings in the month of August, and potted off into small 60-size pots, the points of the leaders being nipped out, and then having a bed of decayed manure and fine earth ready, they are turned out in May into the ground one foot apart, and kept well supplied with water, and frequently stopped through the early summer months, very fine and bushy plants full of berries will be had by the early autumn. Then a good soaking with water should be given them, and they may be safely taken up with a good ball of earth, potted with fine sandy peat and dung, well watered, and housed; they will then be none the worse for the moving if this is carefully done. The points of the young growth will strike freely in fine peat, in a mild heat.

By Seed.—Sow the seed in the spring, in pots of peat and old dung, or maiden loam and fine leaf-mould, on heat. Plant out as soon as large enough, or put into pots according to the object in view: small pots if for reserve stock, and large pots if the plants are for quick-fruiting ones.

The Cyclamen (*Primulaceæ*).

This genus is a great favourite, being a very free and pretty flowerer. It is, generally speaking, easy to grow, and is used for early and late flowering, and serves well for cut blooms. There is, however, but one method of propagating it, and that is by seed, which, however, will not always answer for perpetuating the particular species or variety, for, like all the genus, it will most probably vary more or less in the seedlings from the parent plant.

The bulbs will live to a great age, keep sound, and flower annually, if not injured at the crown. If this is destroyed, it is worth nothing. After the Cyclamen has done flowering the bulbs may be put outside, from the month of May till October, behind a north wall or in a shady place, and some manure-water should be given it, to help the development of a good flowering crown for the following season.

The seed should be sown in the spring, about the end of February, in deep seed-pans filled with fine sandy peat and pulverised manure of equal parts, or maiden loam and leaf-mould and silver sand of equal parts. Make the soil firm, sow the seed, cover it half an inch with soil, and set it in a good lively heat till it is up, when the pans should be put in a little lower temperature until large enough to prick off into other pans. Or they may be planted out in a fine bed of the above compost till the autumn, when they may be taken up carefully with balls of earth, and put into small pots, and then placed in a warm house or pit, where they will give some little flower; and by bedding them out the next summer under a north wall in a bed of leaf-mould with a little maiden loam mixed with it—one part to three of the leaf-mould—the bulbs will be good flowering corms by the autumn.

The Primula (*Primulaceæ*).

The *Primula Chinensis*, or *Sinensis*, as it is called, has been brought to a pitch of perfection, combined with the greatest diversity, never perhaps reached before. This division of the genus contains enough diversity of colour and character to constitute sufficient variety for the most fastidious taste, as a collection of plants for a house, without any other. Nearly every shade of colour may be had from a five-shilling paper of carefully saved seed from a good collection, of which there are now many in this country.

If large specimens are required, the seed should be sown as early as March, and grown freely, the flower-

buds being nipped out as they appear, and shifted from 3-inch pots on successively till they are in 6 or 7-inch pots; but I think they look much prettier, and they certainly possess many more flowers, if they are sown in the middle of April or the beginning of May, and are allowed to flower in 4-inch pots.

Fill some seed-pans with a compost of two parts decayed old leaf-mould and one part maiden loam, sifted fine; then add enough silver sand to insure freedom, put in a good drainage of sherds, and a layer of siftings over them; then fill up with the fine compost, and press it firmly into the pan. Make smooth on the surface, and sow the seed evenly over it, but not too thick, and sprinkle as much fine soil over the seed as will cover it as thick as a new halfpenny, and set the pan in a mild heat, shading it from the sun. Keep the seed moderately moist, but not saturated with water, and do not let the pan ever get quite dry. The seed is slow in germinating; it will not come up under four or five weeks.

The Primula is also propagated by cuttings of the side-shoots at the base of the plant after flowering. Take these off with a keen-edged knife, with a small heel of the old wood, trim neatly, and insert them in small pots, each singly, and give them a little water; then set them in a very mild heat, and in the shade.

The Coronilla (*Fabaceæ*).

The Coronillas do exceedingly well in the open air as permanent shrubs in mild climates, such as the West of England counties, at Torquay, &c., where they flourish and flower abundantly, forming a pretty moderate-sized shrub; but in the northern counties they require the protection of a greenhouse, where they are a very free-flowering ornament, and too well known to require further comment. Their propagation consists in striking cuttings of the points of the shoots 2 or 3 inches long, at any time, without heat in summer, and in a mild heat during the winter, in pots

of fine peat or decayed manure and maiden soil, with a small portion of sand added.

The Ixora (*Cinchonaceæ*).

This is one of the grandest-flowering evergreen greenhouse dwarf shrubs we possess. Generally they are classed among stove plants, but they will do very well in a good greenhouse, at the warm end, during the winter.

Their propagation is by cuttings of the half-ripened young wood in pots of fine sandy peat, under a bell-glass, in bottom heat.

The Abelia (*Caprifoliaceæ*).

A pretty tribe of showy evergreen shrubs with bright flowers, which are produced in abundance. Their propagation is by cuttings of the half-ripened young wood in pots of fine peat, and set in a frame, or under a handlight, and potted off as soon as they have struck root into 3-inch pots, and housed, or kept in a frame or pit.

The Polygala (*Polygalaceæ*).

A pretty-flowering genus, much resembling small pea-blossom. The greenhouse varieties are useful for cut flowers for bouquets, among other things. *P. Dalmaisiana* is a very pretty variety, and of free growth. It requires frequent stopping to induce a dwarf habit. The flowers come on the ends of the young growth, so that the more there is of this, the greater number of flowers there will be. The propagation of this species consists in sowing the seed in the spring, in pots filled with peat and maiden loam, or maiden loam and leaf-mould and some sand, and set in a mild heat; also by cuttings of the points of the young shoots with short joints, and a little firm. Insert them in pots filled with fine sandy peat, with a third maiden soil, and plunge in a mild heat.

The Siphocampylus (*Lobeliaceæ*).

This is one of the most splendid tribes our warm greenhouse or stoves can possess. *S. Coccineus* and *Longipedunculatus* are fine subjects for the conservatory. They are ample as regards their foliage, and the flowers are rich, and are not of the common class in their general features. They belong to the natural order Lobelia, which, however, they little resemble, either in the character of the plant or in the flower. The leaves are long and the flowers equally so, and somewhat like *Salvia fulgens*, only the latter are much longer. They require frequent stopping to induce a dwarf habit. They should be grown in one part peat and one part maiden soil, or maiden soil one part, and leaf-mould two parts, with a good drainage. They may likewise be propagated by cuttings of the firm side-shoots, 4 or 5 inches long, inserted in pots filled with fine peat, and plunged in a mild dry heat.

The Streptocarpus (*Gesneraceæ*).

This is a small genus of beautiful-flowering greenhouse plants. The flowers are much like a Foxglove in shape, but of a fine purple blue, and are thrown up above the plant in a very conspicuous manner. The plant is a dwarf, not rising above the pot more than a *Primula Japonica* does, and continues in flower for many weeks. I refer more particularly to *S. Rexii*. It is easy to grow, and makes a pretty object when it becomes a large and strong plant. It should be grown in good rough peat, maiden loam, and some sand, and may be multiplied by seed sown on the surface of fine peat and maiden loam and some sand, and slightly covered with fine soil, with a square of flat glass laid over the pan or pot. Care is necessary in watering the seed; use the dewpot—(see page 100). The Streptocarpus may be propagated by division of the root also, after it has flowered.

The Statice (*Plumbaginaceæ*).

This is sometimes called Armeria, Thrift, &c., neither of which, however, comes under this head. The tender and half-hardy species are pretty, and useful subjects of the greenhouse, and none more so than *Sinuata*. This variety is well worthy of cultivation, if only as cut flowers. It is very free in flowering, and is seldom or never out of flower. A large pot or two of this may be turned to good account for cut blooms, with other things, for vases. The flowers are pale blue with white, and last a long time. Their propagation consists in sowing seed in pans in the spring, and setting them in a mild heat; also by division of the root.

The Phormium (*Liliaceæ*).

This is a small genus, which, however, has of late had some splendid additions. The old *tenax* is a beautiful thing of itself, but *P. Colensoi*, *P. Cookii*, and *P. tenax variegatum* surpass it, inasmuch as these possess a lovely striped foliage. Large plants of these Phormiums, when well grown, are grand objects for the conservatory. They may be multiplied by seed, and by division of the root. Sow the seed in deep seed-pans, filled with fine peat and maiden soil of equal parts, and subject the seed-pans to a good heat. Offsets may be taken as soon as the plants have done flowering, and potted singly in 4 or 5-inch pots, using the same compost, and plunging the pots in a mild heat.

The Dracæna (*Liliaceæ*).

These are a grand tribe of foliage plants, some attaining to the stature of trees. Some of them are hardy enough to stand our climate in the western counties unprotected. *D. Australis*, *Indivisa*, &c., will do well in a sheltered place out of doors in Torquay. The propagation of the Dracænas consists in raising them

from seed; and some by cuttings when they offer themselves, which is not very often, as these can only be had from the branches, pieces of which are put in a strong bottom heat to root. The seed should be sown in the spring in deep seed-pans, filled with sandy peat and maiden soil, two parts of the former to one part of the latter, and put in a good brisk bottom heat. Cover it from 1 to 3 inches according to the strength of the seed.

The Cactus (*Cactaceæ*).

In this genus we possess some of the most grotesque as well as beautiful subjects to be found in natural history. It is judiciously classed under several distinct heads—viz. *Echino-cactus*, *Melo-cactus*, *Mammillaria*, and *Epiphyllum*. Under each of these we have a class possessing some distinct peculiarity. In the first we have what may be called the Hedgehog Cactus, being all thorns; in the second, one resembling the Turk's Cap, or a deeply corrugated class with a round top; in the third, one that bears numerous small nipple-like young ones; and, under the fourth, we have that with flat leaf-like branches, and which is the most common.

The cultivation of the Cactus may be considered under two heads—viz. by active stimulation during the growing season, and by a perfect suspension of the stimulating agents during the season of rest. The active season is during the summer, and the resting season is during the winter. The stimulating agents are heat and liquid manure, which must be entirely withheld from October until March, when they may be renewed.

The propagation of the Cactus tribes consists in striking cuttings, by offsets, and by seed. All classes of the Cactus produce offsets more or less; but the first three are the most remarkable in this respect, especially the *Melo-cactus* and the *Echino-cactus*. All those that produce these young ones, which are perfect in themselves, may be detached at any time, dried for a week

by allowing them to remain unpotted for that time, then put into small pots (3-inch), using a rough maiden loam, with pulverised old manure and some crushed bones mixed in the compost, and set in a warm house. Those which are flat, triangular, and four-sided can be freely propagated by cuttings of the branches or segments of the plants. Take the cuttings off at any time, the summer being the best, trim them, and let them lie on the shelf for a week, then insert them in pots filled with the above compost, and set them in a mild dry heat, and give them a little water. The seed of the Cactus should be sown in pots or seed-pans filled with the above compost, and put in a good heat.

The Gesnera (*Gesneraceæ*).

These are always classed with stove plants, but they may be successfully reared in a good greenhouse after they are once started into growth. This must be done in a hotbed frame or a pit in the spring. What has been said about the *Achimenes*, as regards starting the roots into growth, applies to this plant also. The *Gesneras* are a superb genus, remarkable for the richness of their leaves as well as for their flowers. There is no tribe of plants more diversified and beautiful than these. When the plants have done flowering, dry them off gradually, and, finally, take the bulbs out of the pots, and store them away in dry pure sand in a warm drawer till February or March. Their propagation is by division of the root in some cases, by cuttings of the leaves and stems, and by seed—(see the Achimenes and the Gloxinia, pages 118—120).

The Mitraria (*Gesneraceæ*).

This is a very free-flowering, beautiful greenhouse shrub. It produces Gesnera-like scarlet flowers on long footstalks, which give to the flowers a beautiful drop-like feature, somewhat similar to a Fuchsia, excepting in the flowers themselves, which, instead of being sepaled

as the Fuchsia is, are mitre-like—*i.e.* contracted at the orifice. The plant should be trained, when young, to a single clean stem up to a foot high, then stopped to induce a head; for if it is allowed to take its own course it will throw up a lot of suckers and young stuff at the base, which will give quite a confused feature to it, and hide all its beauty, for most of the flowers will be in the interior of the plant. The soil should be peat and maiden loam, two parts of the former to one of the latter. It may be propagated by cuttings of the solid young wood 2 or 3 inches long, trimmed, and inserted in pots filled with fine sandy peat, and set in a mild heat.

BOOK VI.

ON THE PROPAGATION OF SUFFRUTICOSE AND HERBACEOUS PLANTS.

Suffruticose Plants.

The word "suffruticose" refers to all those plants that possess half woody and half herbaceous stems or branches, such as the shrubby *Calceolaria*, the *Wall-flower*, the *Pentstemon*, some of the *Begonias* and *Mesembryanthemums*, the *Heliotropes*, &c. All suffruticose plants may be propagated either by seed or by cuttings of the young growth, or raised from seed whenever it can be obtained.

Alonsoa.—Sow the seed in pots or pans of fine leaf-mould and maiden soil of equal parts in the spring, and set them in a mild heat. Cuttings may be struck at any time, the early spring and the autumn being the best. Set them in a mild heat.

Ageratum.—A beautiful genus for the greenhouse and for bedding. Sow the seed early in the spring, on heat. Cuttings of the young growth in the spring or autumn.

Antirrhinum.—A well-known and superb genus for borders, beds, and for ornamenting walls. Sow the seed in the open ground, either in the month of August for early flowering next year, or in April for flowering late in the following autumn. Cuttings may be struck at all times of the short side-shoots, August being the best time for young plants for the following season.

Alyssum.—A dwarf hardy suffruticose plant, well

adapted for edgings, borders, beds, and rockeries. Sow the seed in the spring, in the open ground, in fine soil. Cuttings may be struck during July, in pots or under a handlight, selecting the young growth. I refer more particularly to *A. Saxatile.*

Begonia.—See p. 109.

Calceolaria (Shrubby).—See p. 113.

Heliotrope.—A well-known plant. Cuttings in the spring and autumn, in heat. Sow the seed in the early spring, in pots or pans filled with fine leaf-mould, maiden soil, and sand, and set in a good heat.

Mesembryanthemum.—Shrubby, purple, and yellow. The purple is one of the most showy dwarf plants it is possible to possess, either as a pot plant or for small beds. Cuttings of the young growth in the early autumn.

Pentstemon.—A splendid genus. Some very fine additions have been made to this tribe of late, fit for pots as well as for beds. Sow the seed in pans of fine leaf-mould and maiden loam of equal parts, with some sand added. Set in a mild heat till it is up. Cuttings may be struck at any time, the autumn being the best for strong plants for the following season.

Wallflower.—Too well known to require any description. Lady Alice Peel, the Double-blood, and the Double German are the best. The first eclipses all others for purity of colour—golden yellow—and for the quality of its flowers. Cuttings only, in the months of April and May. The cuttings, or slips, which are the best, should not be more than 3 inches long—2 inches are enough—of the young side-shoots. Slip them off, and just trim off the tip of the jagged end of the base of the slip, and insert them in ground a little bit shady, or in pots or deep seed-pans, and water them.

Herbaceous Perennial Plants.

The Auricula.—By seed and by offshoots. Sow the seed in deep seed-pans or good boxes in the month of February and early part of March. First put a good

drainage at the bottom, then a layer of coarse siftings from the same soil over the crocks, and fill the pans up to the rim with a compost of one part good maiden loam and one part leaf-mould, with as much silver sand added as will give the compost a porous texture only—two quarts of sand to two pecks of compost will answer the purpose. Press the soil (which should be sifted fine) well into the pans or boxes, making it firm, and make it smooth on the surface; then sow the seed thinly over the surface, and cover it as thick as a new shilling. Set the pans in a cold frame till the seed is up, and then set the seedlings outside in a shady place from May until the autumn. Prick off the seedlings into other pans or boxes as soon as they are large enough to handle, and set them in a shady place till October.

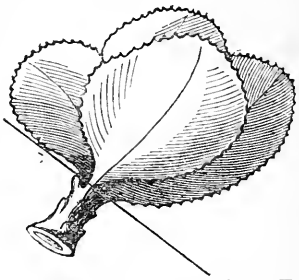

Fig. 30.—Auricula cutting. The line shows the depth to insert it in the soil.

THE PRIMULA.—There are five or six classes of this genus, viz. the *Primula Chinensis* or *Sinensis*, the *Primula Japonica*, the *Primula Cortusoides*, allied to *Primula Japonica*, the *Primula Polyanthus*, a hybrid between the Polyanthus and the Primrose, and the *Primrose*, of which we have many beautiful double and single varieties. Each of these possesses some special peculiarity of its own. The Chinese Primrose is the most useful and popular, and contains the greatest variety. This is only fit for the greenhouse and the window. The single varieties of it are raised from seed sown in seed-pans filled with one part leaf-mould, one part maiden loam, and one part silver sand, and set in a mild heat. It should be sown in April. The double varieties must be propagated by cuttings or offshoots —(see page 123).

THE PRIMULA JAPONICA.—This comparatively new kind possesses some very curious and beautifully con-

structed varieties, but it is a most fastidious species to deal with: nothing will save the plants from total failure at times. The seed should be sown in the spring, in seed-pans filled with the same soil as for *Primula Chinensis*. The soil should be watered first, and then the seed should be sown and subjected to a moist mild heat. It would vegetate more quickly if it were first soaked for 3 or 4 hours in warm water in which a few grains of sulphate of ammonia had been dissolved—5 grains of the ammonia to a half-pint of water is about the safe quantity to use. Let the seed lie in this solution for 4 or 6 hours, then drain off the water, dry it by laying it between two sheets of blotting-paper, pressing them together, and then sow the seed immediately.

The Primula Cortusoides is a hardy border plant, and may be treated like the *Polyanthus*, by seed and by division of the root. All the single Primroses may be multiplied by seed sown in the spring, and all the double ones must be propagated by offshoots or by division of the root.

The Carnation.—The propagation of the Carnation, Picotee, and Pink is by one and the same process: by seed for new sorts, and by pipings and layers for multiplying all standard sorts, or any kind to be preserved. The seed should be sown in the month of March or April, in fine good ground in the open air, or in deep seed-pans, and set in a cold frame. The piping and layering should be done in June or July. "Piping" is nothing more nor less than cuttings of the young grass taken off with 3 or 4 joints without any flower on them, cut at right angles immediately below the third joint from the top. Pull off the leaves by a sudden jerk, and insert them in pots or deep seed-pans filled with one part of maiden soil, one part of leaf-mould, and one part of silver sand, sifted fine all together. Water the pipings, and set them in a close cold frame; or they may be advantageously plunged in a very mild bottom heat. Pink pipings will do very well inserted thickly under a handlight in the same compost on a warm border.

Layering is done on the spot where the plant is

growing. A good plan is to put half a peck of the fine compost down to each root where layers are to be made, and level it fairly down under the layers or the young grass to be layered. Then proceed to the layering; trim all the leaves off from the third joint from the top of the stuff to be layered; make a tongue on the under side upward, setting the knife in at the joint, cutting carefully half-way through, and drawing it upward to the next joint; then carefully spring the tongue out by bending the layer and bringing the top upright, scratch a hole in the soil, and bend the layer down into it, keeping the tongue open; peg the layer down with a wooden hook, and cover all with the fine soil. If the weather is dry, give a good watering when all the layers of a few plants are done.

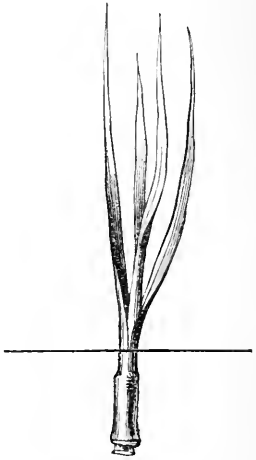

Fig. 31.—Carnation cutting. The line shows the depth to insert it in the soil.

The Carnation piping may contain one more joint with advantage.

The Delphinium.

The Delphiniums are a genus of as noble and hardy perennial plants as any we possess. The new addition, *D. Nudicauli*, is the only one that approaches scarlet, the prevailing colour being blue. No flower-garden should be without some good clumps of Delphinium, for I know of no hardy perennial so well deserving a prominent place in the borders as they do. They are multiplied by seed and by dividing the root. The seed should be sown in pans or in the open ground in the spring, and shaded a little till it is up. The roots may be divided after they have done flowering, or in the spring. The slugs are great enemies to the Delphiniums.

The Myosotis (Forget-me-not).

This genus is too well known to require any description from me; but I will just remark that the difference existing between the various kinds is great. *Alpina* and *Palustris*, for instance, are widely different although sometimes sold as the same. *Palustris* grows more compact, flowers more freely, and is of a brighter blue, and is, moreover, not so common. *Dissitiflora* and *Sylvatica* also differ, although resembling each other. *Dissitiflora* has larger and rather brighter flowers than *Sylvatica*. *Azorica* is a large-flowering species, which, however, does not flower so freely as the others; but it grows to a strong clump, and has a large and ample foliage.

All the Forget-me-nots can be multiplied by seed sown in pans or in the open ground in the spring; also by dividing the root; but seedlings make the best plants. Sow *Dissitiflora* in May, *Azorica* in April, and *Alpina* in July or August, for flowering the following spring. *Palustris* requires an abundance of water.

The Phlox.

In this genus we possess a character and diversity not to be equalled by any other tribe of hardy or half-hardy plants in the floral world. There is almost diversity enough of character and colour to constitute sufficient variety for a garden without anything else. There are the *Subulata, Nivalis, Reptans, Vernoniana, Setacea*, all creepers or procumbent varieties, fit for the edgings of beds as well as for small beds. Then we have the erect-growing ones, varying in height from 1 to 2½ feet, with colours from pure white to a dark purple; and nothing can equal some of these for the abundance of flowers on single plants.

The Phlox Drummondi is a well-known species, an annual for beds unequalled for intrinsic beauty. All the Phloxes may be raised from seed. The annual species must be raised in the spring. Sow the seed in pans filled with half leaf-mould and half maiden soil, set

in a mild heat. The perennial sorts may be raised from seed for new varieties. Sow in deep seed-pans, in soil as for the annual species, in a gentle heat till it is up. Also by cuttings of the short side-shoots in June, July, and August. Insert the cuttings in pots filled up with fine peat and a little sand, setting the pots in a close cold frame pit, or under hand-glasses. Propagate also by division of the root in the autumn or early spring.

The Viola.

There are several divisions in this genus, each possessing some peculiar feature of its own. There is the Pansy, with its numerous species and innumerable varieties. The Violet, with its several species and varieties. These are again subdivided. Of late years some sorts of hybrids have been introduced into the Viola class, partaking both of the Violet and the Pansy. These assume more of the features of the latter, and, to some extent, the property of the former.

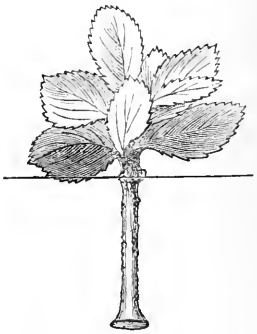

Fig. 32.—Pansy cutting.*

The Pansy class has produced some curious and novel, not to say beautiful, varieties of late years; but the much-coveted scarlet Pansy, pure and good, has not yet appeared, although some approaches to it have been made. I had one lately from the Belgian class.

The propagation of all the Viola genus may be assimilated; all may be propagated by cuttings of the young growth, taken off before it flowers, and inserted in pots, pans, or in the open ground; also in frames or under handlights in a somewhat shady spot, using

* Pansy and Auricula cuttings should contain a little root at the base in general when they are taken off the old plants. The line shows the depth to insert them in the soil.

any good common soil with some sand in it. All except the double Violets may be multiplied by seed sown in the autumn or the spring; in pans in the autumn in a cold frame, and in the spring in the open ground in fine soil. The double Violets should be propagated in April or May.

The Dianthus.

All the Dianthus tribe are more or less beautiful. The Indian Pink class contains, perhaps, the greatest diversity of any in regard to its colour and pencillings. These may be sown where they are to flower, every March, and treated as annuals. The Barbatus class contains some magnificent varieties, as the Auricula-eyed, which, when true, are superb border plants. This class must be propagated by layers of the young off-shoots to preserve the kind true, for it will degenerate from seed, however carefully sown. The Heddewigii is perhaps the most splendid of the dwarf kind. This is no doubt an improved Indian Pink, and should be sown every spring. The Spanish class is very pretty. The Double Mule Pink is a beautiful class, very dwarf, and an abundant flowerer; a choice thing, and will come from seed pretty true, but should be propagated by divisions of the root. This is a hybrid. The Deltoides is a small and beautiful dwarf creeper or trailer, suited well for edgings and for covering stones, rockwork, &c., and may be obtained by seed and by division of the root.

The Oxalis.

This genus includes some beautiful species and varieties. The *O. tropæoloides* is a very conspicuous and useful one. Its foliage is of a dark copper or bronze, the flowers being of a bright yellow, but the foliage is most conspicuous on rockwork. The Oxalis requires a sunny open spot to display its flowers to advantage; and a sandy soil, good drainage, with an abundance of water in the growing season, and a season of rest for the tuberous and bulbous-rooted sorts, with

but little water at this time, though they must never be allowed to get perfectly dry.

Their propagation is by seed for those sorts from which it can be had, and by division of the root of the perennial species, and offsets of the bulbous kinds. Sow the seed on the surface of pans or pots filled with peat, leaf-mould, and maiden soil, slightly covered, and set in a mild heat, being a little shaded.

THE ŒNOTHERA.—By seed sown in the spring, and by cuttings during the summer. *O. macrocarpa*, yellow, and *O. taraxacifolia*, white. Both are procumbent varieties. By cuttings of the young growth, inserted in pots of peat and pulverised manure.

THE HEPATICA.—This is a species of Anemone, and may be treated in a similar manner. Each crown may be planted singly in the early autumn, but instead of frequently removing them, let them remain. Seed may be obtained from foreign merchants. Sow it in the spring in deep seed-pans, and set in a cold frame till up, then transplant out.

THE ECHEVARIA (*Crassulaceæ*).—These are a pretty tribe of hardy dwarf plants. The natural order (*Crassulaceæ*) conveys no idea of what the flowers of this genus are. As I have said before, the term means thick-leaved, and no more. The flowers of the Echevarias are very beautiful, and the plants themselves are handsome-growing, and admirably adapted for a very small bed on dry places, or for edgings, rockwork, &c. They may be had from seed sown in seed-pans well drained and filled with peat, leaf-mould, and maiden soil of equal parts, with some sand added. Make the soil firm and even, then sow the seed on the surface, and slightly cover it with fine soil, and set in a mild heat; use the dewpot when water is required. They may be readily propagated by offsets in the autumn.

THE SEDUM (*Crassulaceæ*).—Although similar in some instances to the Echevaria, the flowers are quite different. The Sedums are a hardy genus, flourishing on stone walls, rocks, &c., and are most useful, many of them being even beautiful. The leaves of some of them

are a specific for curing corns, rapidly allaying pain. The Sedums may be had from seed and from division of the root. There are a great many varieties, and all are dwarf rock plants.

The Saxifrage (*Saxifragaceæ*).

This genus varies much, some assuming a coarse and common, while others possess a graceful and fine character. By way of explanation I refer to *S. crassifolia* and *S. granulata*, also *S. umbrosa*—"London Pride." This last is no doubt a beautiful old plant, the flowers being extremely pretty and graceful. It may be raised from seed, and propagated by offshoots and division of the root.

The Campanula.—A genus of noble and very showy plants, assuming various characters, from the gigantic *C. pyramidalis* down to the insignificant dwarf *pumila*, 3 inches high. *C. pyramidalis* may be looked upon as the best and most noble species, of which there are two or three varieties—a deep blue, a pale blue, and a white. *Pyramidalis* may be easily grown to 6 feet high and 2 feet through. I find the best way to obtain large and well-formed specimens is to get them from seed sown in pans filled with fine peat and decayed manure on a mild heat in the spring. Pot off as soon as the seedlings can be well handled, and set in a cold frame; continue to grow them, and turn them out into the open ground in the following spring, giving the plants good room and strong manure during the summer. Take them up with a large ball of earth in the autumn, and use 11-inch pots; keep them in a cold frame through the winter, and as soon as March comes give the plants some strong liquid manure once a week. This must be continued carefully, and they will then start into growth for flowering, throwing up numerous strong flower-stems; the outside ones must be tied out to sticks.

This variety may also be propagated by cuttings of the roots 2 or 3 inches long, and inserted in pots filled with peat and rotten manure, and set in a cold frame or

pit. All the perennial Campanulas—viz. *Grandiflora*, *Nobilis*, and *Carpatica*, &c.—may be propagated by division of the root, and by seed when it can be had.

The Aquilegia (*Ranunculaceæ*).

All the Columbines are beautiful. The peculiar construction of the flower of the double ones renders this genus a curiosity. They are a handsome tribe of hardy perennials, and no garden should be without some of them; for borders in good-sized single clumps they are unsurpassed for effect. All of them may be raised from seed sown in fine soil in the open ground in April, and also by division of the root.

The Chrysanthemum (*Asteraceæ*).

There are three divisions in this favourite genus —the Chinese large-flowered, the Japan, a curious shaded class, and the Pompon. Each of these possesses some peculiar feature of its own. The Chinese class is the most noble-flowered; the Japan class possesses medium flowers of some two or three colours, frequently, in the same flower; the Pompon class possesses very small and perfect flowers of every tint.

The propagation of all these is by cuttings of the young growth 2 or 3 inches long in the month of February or the beginning of March, taken off and inserted in pots filled with fine-sifted old manure one part, maiden loam one part, and sand one part, and set in a mild heat; potted off as soon as rooted, and grown as fast as possible in a cold frame, being frequently stopped to induce a bushy growth, finally shifting them into 8 or 9-inch pots, and setting them outside in an open place where the plants can have the benefit of the full sun and light all round, frequently stopping the young growth up to the end of July, when it must be discontinued.

Layering may be resorted to as a good method of propagation. To do this well, put the plants out on a

quarter or bed in an open space in good ground. Plant them not less than 3 feet apart every way, when they will (or should) grow very strong, and will certainly do so if the ground is rich. About July or August bend the young stuff down carefully, and lay it in the ground near the tops, burying 6 inches of the growth in the soil, and letting 4 or 5 inches of the tops stand upright out of the ground. The leaves must be cut off the part to be buried in the soil, and a slight twist given to the layer just where the leaves are taken off; this will promote rooting. As these layers advance in growth, water may be required for the proper rooting of them, and by the time the layers are in bloom they will be sufficiently rooted to allow of them being taken up and potted. Good balls of earth must be attached to the layers, potted on the spot, carried away to a shady place, and thoroughly soaked with water. These layers will not much detract from the old plants, for they will maintain a good show of flower notwithstanding. The Chrysanthemum may be raised from seed for new sorts, but the chances for improved ones are very precarious. The seed must be sown in seed-pans in the spring, and set in a mild heat.

The Lily of the Valley (*Convallaria*).

The Lily of the Valley and all the *Polygonatum* genus may be propagated by offsets and division of the roots, which should always be done in the autumn. Single crowns may be selected, cut neatly out, and transplanted 3 or 4 inches apart in good sandy soil in a little shady aspect.

The Helleborus.

All the Helleborus tribe may be propagated by division of the roots in the early autumn, selecting a crown to each cutting. They may also be raised from seed when it can be had, which, however, is not often. Sow the seed in deep seed-pans, and set it in a mild heat till it is up, then remove to a cold frame to harden off.

The Hardy Orchis.

Here is a section of a genus at once not only beautiful, but most curious, and well worthy of the attention of all lovers of what is uncommon and peculiarly interesting. When I say uncommon, I mean that these singular plants are seldom seen in a state of cultivation, not because they are difficult to grow, or not worth the trouble, for I know of no class of plants that possesses so much real interest as the Hardy Orchis—"Terrestrial Orchids," as they are called, *i.e.* those that grow in the ground and in pots. Many of these grow in England in the woods, forests, &c., on dry, sandy soil. There is a spot in a large wood belonging to the Hill Hall Estate, Theydon Mount, near to Epping, Essex, on a dry, sandy hillside, where I have seen some of the *O. Apifera*—Bee Orchis—extraordinarily fine.

There are twelve or thirteen species and varieties of Orchis growing in England, and many more equally as hardy from other parts, that can be grown either in the open ground or in pots in cold frames, which would form a most interesting and curious collection not frequently to be seen nor easy to be matched; they may all be had from seed and by roots. The time to obtain the bulbs or tubers is early in the autumn, when they should be carefully potted in well-drained pots, using medium rough maiden soil and peat and sand of equal parts; set in a good dry cold frame. Give little or no water at the first potting, unless the soil is dry; water will be more liberally required as soon as growth commences. None of these terrestrials like removals, so that disturbing them often must be avoided.

The seed should be carefully sown on very rough peat and moss, chopped up, mixed, and pressed firmly into deep 10-inch seed-pans; watered first. Then sow the seed, and slightly cover it with some finer sifted peat and moss or leaf-mould, and set the pans in a shaded cold frame or pit; it should be sown as soon as ripe. Slight sprinklings with the dewpot will be

necessary at times, but never heavy waterings for the seedlings.

The Pyrus Japonica,
The Perennial Asters,
The Gentiana,
The Daisy,
The Pyrethrums,
The Lychnis,
The Arabis,
The Commelyna,
The Chelone, and all this class of perennial plants, may be freely propagated by dividing the roots in the spring, as soon as they begin to grow.

The Potentillas,
The Catananche,
The Rocket,
The Agrostemma,
The Perennial Lupine,
The Geum,
The Linarias,
The Perennial Poppy, and all this class, are best raised from seed; some, however, may be propagated by cuttings, as the double Rocket and the *Linaria.* All those perennials that throw up numerous stems from the root may be easily multiplied by division—for example, the Monk's Hood, the Aster (or Michaelmas Daisy), the Lychnis, &c. But such as only possess one crown, or rather one underground stem, as in the case of the Perennial Poppy, must, as a rule, be multiplied by seed.

The Class of Annuals that must be Raised on Heat first, and Transplanted to where they are to Flower.

The Aster, many varieties.
The Brachycome (*Asteraceæ*), two varieties.
The Browallia (*Scrophulariaceæ*).
The Celosia (*Amarantaceæ*).
The Fenzlia (*Polemoniaceæ*).

The Balsam (*Balsaminaceæ*).
The Jacobæa (*Compositæ*).
The Marigold (*Asteraceæ*).
The Mesembryanthemum (*Mesembryaceæ*), tricolour.
The Nycterinia, sweet-scented, choice.
The Phlox Drummondi (*Polemoniaceæ*).
The Portulaca (*Portulaceæ*).
The Salpiglossis (*Scrophulariaceæ*), a splendid large-flowered annual, having rich colours.
The Ten-Week Stocks, German.
The Sultan (*Compositæ*), one of the sweetest annuals we possess.
The Tagetes, a very dwarf Marigold.
The Zinnia (*Compositæ*).
The Xeranthemum (*Compositæ*), large-flowered everlastings.
The Anagallis (*Primulaceæ*), many choice dwarf splendid annuals.
The Acroclinium (*Compositæ*).

The Class of Annuals that may be Sown where they are to Flower.

I have adopted this class method, considering it quite a sufficient guide, without going into a long or short individual detail as to the treatment of each one. In every case the reader must bear in mind that the smaller the seed the finer must be the soil, and the seed must be buried less deep. For example, Love-lies-bleeding must first have the surface of the ground well prepared, and raked as if finished; then sow the fine seed evenly over it, and rub the back of a spade or a rake lightly over the surface. But those seeds that are larger, as the *Saponaria*, should not have the surface of the ground raked down quite so fine before the sowing.

Such as the *Nemophila* must have the surface less fine still, and be slightly heeled in with a fine rake—*i.e.* lightly chopped in; while Convolvulus Minor and similar kinds, and very small Lupines, should be either

chopped in with a coarse rake, or drilled in with the hoe about an inch below the surface. Those who observe this rule in sowing annual flower seeds will have no cause to complain about their seeds not coming up, as is so frequently the case, through either burying them too deep or not deep enough.

Hardy Annuals.

Adonis flos (*Ranunculaceæ*), showy.
Agrostemma cœli rosa.
Bartonia aurea (*Loasaceæ*).
Cacolia (*Compositæ*).
Calandrinia (*Portulacaceæ*), white and purple.
Calliopsis (*Compositæ*), many varieties.
Campanula (*Campanulaceæ*), many varieties.
Candytuft (*Cruciferæ*), many varieties.
Clarkia (*Onagraceæ*), many varieties.
Collinsia (*Scrophulariaceæ*), many varieties.
Convolvulus (*Convolvulaceæ*), many varieties.
Eutoca (*Hydrophyllaceæ*), several varieties.
Godetia (*Onagraceæ*), many varieties, showy.
Gilia (*Polemoniaceæ*), good annuals.
Gypsophila (*Caryophyllaceæ*), showy annuals.
Kaulfussia (*Compositæ*).
Larkspur (*Ranunculaceæ*).
Limnanthes (*Tropæolaceæ*), good annual.
Love-lies-bleeding (*Amarantaceæ*).
Lupines (*Fabaceæ*).
Mathiola (*Brassicaceæ*), Night-scented Stock.
Mignonnette (*Resedaceæ*).
Nemophila (*Hydrophyllaceæ*).
Nolana (*Nolanaceæ*), lovely trailers.

This list will be sufficient to show the class to which I refer, as to the sowing where they are to remain to flower.

BOOK VII.

ON THE PROPAGATION OF FRUITS.

The Apple.

There are a few sorts of the Apple tribe that will grow from slips or cuttings—such as the Keswick Codlin, Old English Codlin, &c.—and some will come true from seed; the Ribstone Pippin, for instance, will maintain its true character from the seed. But, as a rule, all Apples must be grafted on stocks; these stocks may be Apple or Crab. If grafted on the Crab, standards should be the object in view; if for dwarf-trained or bushes, or for tub or pot culture, then they should be grafted on the Apple stock—*i.e.* stocks two or three years old, from the seed or pips. The pips should be sown in February, in drills two or three inches deep, in a good light soil, and covered with some light material, as cocoa-nut fibre refuse, old tan, old hops, or decayed leaf-mould. At one year old the stocks may be transplanted if too thick, or they may remain where they were sown if not too thick, and the ground is good: here they may be grafted at one, two, or three years old, close to the ground. March and April are the best months for grafting Apples.

The raising stocks of either Apple or Crab is the same. The Crabs must be rotted to get the pips out. This is best done by burying them in the ground till the spring; then take them out, tread them, and wash

the seed out; dry it, and sow it as above. Apple pips can be had at cider pound-houses in any quantity.

The grafting of the Apple is a very easy operation. The grafts may or may not be cut from the tree a few weeks beforehand; some affirm that it is necessary to insure success to cut them some weeks before they are grafted, and to lay them in the ground. This may be a good plan with some sorts that are apt to get too forward, and with all sorts when the grafting has to be done late, as the stock should be in advance of the scion a little; but generally Apple grafts will grow well cut from the tree and grafted forthwith. Cut the stock clean off 4 or 5 inches from the ground, and, having the scions close at hand, slip off an inch of the stock up the side as far as the cut at the top, and a corresponding slip off the scion to match the stock (see page 149). Make a tongue in the graft and stock to hang the scion on by, and tie it on with rofea firmly, and clay the union, or unite with stout pug, putting on a little at a time, or use grafting-wax. The wax is made of pitch one pound, 2 ounces bees'-wax, and half a pound of mutton fat, melted. Put all together in a pipkin and melt over a fire, using it with a small painter's brush when half cold. But the pug, well worked up with fresh cowdung, is a good compost for covering the union.

Some sorts of Apples will not answer for dwarfs, and some will not do for standards. The "Cornish Gillyflower," for instance, will not do well as a standard, nor the "White Juneating, "Manx Codlin," "Norfolk Greening," and the "Foundling," as dwarfs. Those sorts that bear early and freely, and grow moderately or feebly, are best for dwarfs, and *vice versâ* for standards. Those intended for the latter must be on good rich ground, so as to insure a fast strong growth from the grafting, or else decrepit, crooked stems will be the result. All spray up the stems, to the height of six feet at the least, should be removed as it comes, with a sharp knife, and the leader maintained unchecked to that height, when the

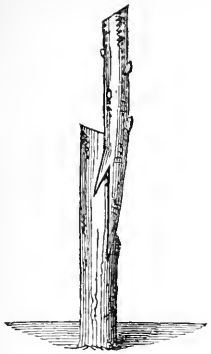

Fig. 33.

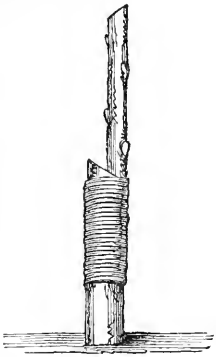

Fig. 34.

Fig. 35.

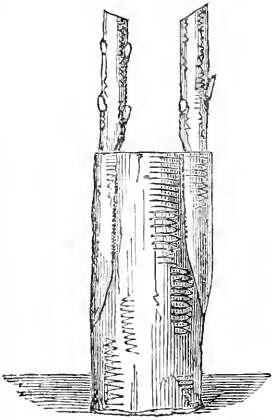

Fig. 36.

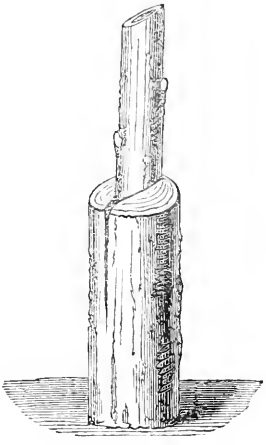

Fig. 37.

Fig. 33.—The Apple, Pear, or Plum grafted, called whip-grafted.
Fig. 34.—The graft tied on.
Fig. 35.—The graft clayed over; for stocks about the same size as the scion.
Fig. 36.—The Apple or Pear rind-grafted.
Fig. 37.—The Apple or Pear cleft-grafted. Each of these kinds of grafting is adapted for large stems, stocks, &c.

top should be cut off; here the branching head will form.

After the first season's growth from the grafting, the shoot of the dwarf class must be cut back to within two or three buds of the union, to induce a good dwarf tree for training. If for dwarf bushes, 1 foot 6 inches may be left of the single shoot; and if for pyramidal trees, the single shoot should be left entire for 5 feet in length, and as many laterals left equally divided from the union up as will form a symmetrical tree.

The Pear.

All new varieties of both Pears and Apples are raised from the seed or pips; but the chances for a good and improved variety of either are very small, and some years must elapse before the result can be fully known. The Pear, when raised from seed, is especially liable to go back to the wild state. Stocks for grafting the Pear may be raised from Pear pips or Quince pips; in either case they must be sown as for the Apple, and grafted in the same way. Pear stocks are used for strong-growing standard Pears, although there are some exceptions to this rule; for instance, those sorts that crack before they are ripe, and possess a grizzly flesh, should not be grafted on Pear stocks, as a rule, but on the Quince. Most Pears seem to acquire a superior quality when grafted on the Quince stock; but the grizzly classes and those that split and crack should decidedly be grafted on the Quince. In some cases, Pears refuse to unite with this stock. When such is the case, some strong-growing variety may be first grafted on the Quince, and the next season re-grafted with the sort first intended for the stock; this is what is called "double grafting."

What has been said about grafting and forming the basis for standard, pyramidal, and dwarf trees under the Apple, applies equally to the Pear.

All Pears that are naturally liable to come into flower very early should, no doubt, be planted on a

south-west or a west wall; for generally those very early-flowering Pears in warm climates and in very mild seasons burst into full flower, and then are cut off by the cold winds afterwards, so that whole crops of fruit are thus lost through being exposed as standards.

The Plum.

The stocks for grafting or budding on the Plum are raised from the Mussel Plum, a very good cooking fruit. The stones are sown in deep drills of good light soil in January or February; the drills should be not less than 3 inches deep, clear from the general surface. The stocks from the stones will be fit for budding or grafting within two years, and the grafting must be done in the spring, but the budding in the early autumn. To rule the time for budding, take notice of two things—viz. the bark of the stock must run well, *i.e.* leave the wood freely, and the bud must be well up, *i.e.* plump; then insert it in the stem near the ground, and bind the bud in. The grafting is done in the same manner as for the Apple. In all cases of grafting, when whip-grafting is the method employed, the stock and the scion must be of the same size. Budding is a more certain method for Plums than grafting. For good results in fruiting Plums, a dry, warm, and gravelly soil is best; in cold clayey soils Plums seldom do well.

Fig. 38.—The Plum budded.

The Cherry.

The propagation of the Cherry is the same as that of the Plum; generally by budding, however, instead

of grafting. The stocks are raised from Cherry stones in the same way as for the Plum. The grafting of the Cherry is very precarious unless judiciously performed, but the budding method is a certain one. See that the bark of the stock runs free, and then that the bud is well up, *i.e.* developed. These are the conditions for successful budding:—Insert the buds at the height the tree is to be; *i.e.* if for standards, let the stocks attain to the height they are to be before the buds are inserted, and if for dwarfs they must be put in the stocks near the ground. The kind of stock to be used should be determined by the character of the tree required. For ordinary standards, stocks raised from the common wild Cherry may be used, but for dwarfs and trained wall Cherries use the *Cerasus Mahaleb* stock; this may be obtained from layers and cuttings. Cherries will not fruit well in a cold clay, but require a stony or gravelly soil, and great care should be taken not to bruise the bark with the spade, or with the hammer or nails.

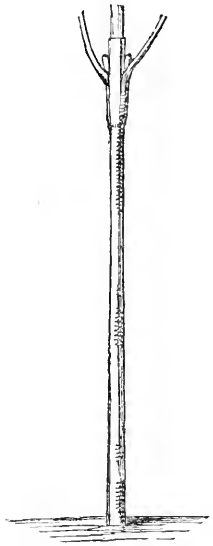

Fig. 39.—The Standard Cherry budded.

The Cherry must be budded close to the ground for dwarfs.

The Peach, Nectarine, &c.

The Peach and Nectarine require a similar soil to that of the Plum and Cherry, although the Peach requires a somewhat adhesive one; but a cold clay subsoil is much against success in Peach-growing. There is no constitutional difference between a Peach and a Nectarine; the difference exists in the flower and fruit, which gives rather an advantage to the Nectarine on

account of the flower being more robust than that of the Peach. The Peach flower consists of broad petals, which, when fully developed, are more liable to be injured by cutting winds than the Nectarine blossom; and, again, it possesses a broader surface when fully expanded, so that more damp gets condensed upon its surface, and renders it more susceptible of injury by the night frosts; hence the more frequent failures with some of the finer Peaches than with the more common ones. The Royal George Peach, for instance, possesses a very broad petal blossom, and more frequently fails to produce a full crop than most others, which may be attributed to the aforesaid cause. The Nectarine, on the contrary, carrying a much smaller flower, is less liable to the same effects.

The stocks on which the Peach and Nectarine are budded are raised from the Mussel Plum. The stones of this Plum should either be sown in the autumn or kept in sand till February, but it is preferable to sow them in large and deep seed-pans in the autumn, and to set them in a pit with a mild heat. The seed or stones must be sown in pans 12 or 13 inches in diameter, and not less than 6 or 7 inches deep, fairly drained, and filled with a compost of two parts good sandy maiden loam and one part pulverised manure. Bury the stones 2 or 3 inches deep; they may be sown nearly as thick as they can lie over the surface. The soil must be made moderately firm. These young seedling stocks must be transplanted into the ground the following autumn, where they are to remain for budding, which they will be ready for about the second July or August from the sowing. The following spring after the

Fig. 40.—The Peach budded.

Of course, tying in the buds is necessary in all cases; and it is so simple that I think it superfluous to give illustrations of it here.

budding, cut the stock down to within a few inches of the bud, and as soon as the latter has made some good growth, cut the remainder of the stump of the stock clean down to the bud in the autumn, a little slanting from the bud (see p. 153). The autumn or spring following cut the shoot the bud has made down to within three or four eyes of the place of insertion; this will form a basis for a dwarf-trained tree. Standards must be trained to the desired height before the shoot is topped—*i.e.* the single shoot from the bud must be allowed to grow to the proper height for a standard-trained tree, which, probably, it will take two years to do; then decapitate the shoot at the proper height.

The Grape.

Various are the opinions on Grape-growing. Some affirm that Grape-vines are best planted inside the house, and others assert that they are best planted outside. Now here I will just give my opinion, founded on experience. Lately I had a large vinery in which there were a set of strong young vines planted inside the house, a great depth of good maiden soil, manure, &c., &c., being well laid in before the vines were planted. They did very well and made a vigorous growth for a year or two, and a fine show of fruit the third year; but when the fruit was about changing colour they were attacked with mildew, and do all I could the crop was poor except on one of them, the fruit of which was fine and healthy. "Now," said I, "we will see how this is;" and as I thought, so it was. We dug down outside the front wall close to it, and there we found the roots of this vine had discovered an opening in the brickwork, and had made some strong feeding-roots, which had been working outside in the ordinary ground, while the others had not. This was the only vine that was really in good health, and the fruit of it was much finer than that of the others.

Some say that the fruit cannot be kept late on late vines if they are not planted inside the house. Now I

think I can prove that being inside the house has nothing to do with it. Every physiologist must be aware, and is aware, that as soon as the circulation of the juices is suspended no further supply, either good or bad, can be communicated from the root to the fruit or branches, and that this communication is really suspended, finally and completely, as soon as the leaves die off and the wood is ripe. To prove this, cut a lateral containing a bunch of fruit off—*i.e.* pass the knife through the limb—and then see if there are any signs of the flow of sap, and let this bunch of fruit and the limb remain as long as the others. If anything is the cause of the fruit not keeping, it is, no doubt, from a want of strength in its early stages, or too much maiming of the bunches in the process of thinning it. Much handling of the bunch and mutilating it give a detrimental check to the process of maturity, checking the onward progress of the juices, and inducing a more or less retrograde action; and then, should there be a want of the supply at the time through a deficiency of the liquid juices in the ground (which is frequently the case under glass), there must be and is a loss to the woody segments of the bunches, and consequently a failure in those parts called "shanking." This shanking may occur at any time, before or after the fruit has matured. I have no doubt it will be found to arise from the same cause, primarily; for it will be seen that in general those bunches of fruit that carry the strongest woody segments maintain an effective resistance, while the weaker ones succumb.

The propagation of the Grape-vine is by various processes—by seed for new ones, by layers, by cuttings, by eyes, and by grafting. By eyes is the most popular; *i.e.* as soon as the wood is thoroughly ripe, select those parts of the young wood that possess sound and bold eyes, and cut them off at right angles above and below each eye, leaving half an inch of wood each way from it. Insert them singly in large 60-size pots of rotten manure and maiden soil, bury them an inch or so, put them in a brisk heat, and keep them moist. As soon

as these have made a foot of growth, shift them into 32-size pots, and continue them in a lively heat, giving them liquid manure.

By Cuttings.—Any ordinary cuttings from the general pruning may be made into lengths of 10 or 12 inches, trimmed at the base just below a bud, and dug into the ground in some moist and warm spot.

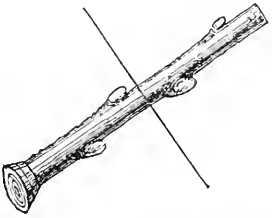

Fig. 41.—Grape-vine cutting, with a heel. The line shows the depth to insert it in the soil.

Fig. 42.—Grape-vine Eye.

Grafting is done in some particular cases, with scarce sorts, on strong-growing common kinds. The stock should be excited a bit before the scion is put on. The scion may consist of two or more eyes, and is done as for Apples or Pears, except that the pots containing the stock grafted must be plunged in a gentle bottom heat, and the union should be covered.

Layering may be done in pots indoors, or in the soil with outdoor vines, in the spring or autumn. Let an eye or two be buried below the surface of the earth, or a young rod may be drawn through the hole in the bottom of the pot, and an eye scraped with the knife, or at least just below the eye, so as to give a check to the sap; this eye must be fixed about the middle of the pot, and the pot then filled up with a good compost of dung and maiden soil.

Seed-sowing may be resorted to when new sorts are wished for. Sow the seed in the early spring in pots or pans, and set in a good lively heat; pot off as soon as possible, and encourage them on.

The Gooseberry.

The Gooseberry is a favourite fruit of our English gardens, and a great acquisition it is, too, in the early seasons. If Gooseberries can be had fit for tarts on Whit-Sunday, untold joy is felt by the millions of our juvenile and adult friends all over the country; but as our climate is fickle, and the seasons vary considerably, it is a matter of some little uncertainty about getting this fruit fit for the purpose at the important time referred to. I think this uncertainty may be obviated to a great extent by planting the Gooseberry on low walls facing the south, or in rows a few feet from the foot of a wall on which Peach-trees are planted, and trained as dwarf espalier trees. Plant a single row 2 feet from such a wall, 4 feet apart, and train them on stakes as for espalier Apple-trees. The stakes may be iron rods or small stakes of wood, 3 feet long, driven 1 foot in the ground, and there will be 2 feet out of it on which to train the fruit trees, laying in the wood right and left 4 inches apart. These dwarf-trained Gooseberries will give an abundance of fine early fruit, and will be somewhat earlier still if trained on a wall. They will look very pretty and neat if done well, occupy but little ground, and amply reward the trouble taken to get extra early fruit.

The propagation of the Gooseberry consists of striking cuttings of the last growth in the early autumn and winter. Any spare stuff may be made into cuttings, which should be 10 or 12 inches long, straight, and stout. Trim the base of it just below a bud, cut it smooth at right angles, leaving the bud untouched at the base, and cut three or four off above it, leaving three or four buds at the top part of the cutting. When a number are done, dig them into the ground, making a trench as for planting Box edging, and lay the cuttings in up to the buds left on them at the top; dig some good earth on to them, and set the foot on the lower part of them, treading the soil on them pretty firmly; dig on, and cut another trench 9 or 10 inches

from the last, and so proceed. Four-feet beds are perhaps the best. Early in September is the best time to put in Gooseberry cuttings, for by so doing a season is gained over those put in late in the autumn, winter, and spring. Seed may be used to raise new sorts. It may be sown in deep seed-pans, or in fine beds under a handlight, in the spring.

The Currant.

The Currant is a most useful fruit, especially the white and the red kinds, the latter being valuable for tarts and jellies. To get fine fruit and possess it longer than ordinary, plant the trees on a west or north wall (see "Multum in Parvo Gardening"), and hang nets over them as a guard against the birds. Red and white Currants may be preserved in their natural state a long time.

The propagation of the Currant may be assimilated to that of the Gooseberry, with this slight difference—all the Currants, red, white, and black, may be made into cuttings, and planted at any time from October until February.

The Raspberry.

The cultivation of the Raspberry is comparatively simple, but one thing should always be borne in mind, viz. that the Raspberry plant objects to frequent removals. The situation is not of so much consequence as a good soil and a permanent standing. The soil should be good sandy loam of a moderate depth, well manured annually, and forked in.

The propagation of the Raspberry is by the young suckers which spring from the distant roots that ramble from the main plant. The suckers should be dug up with the spade, reserving as much of the fibre about it as possible. October and November are the best months to remove them and to make new plantations. I recommend strong one-year-old canes for planting

rather than old stools that have stood some time on the same ground. Next to these one-year-old plants, I advise stools not more than two years old planted out. These will carry an abundance of fibre root, but old stools become barren at the root, and often fail. Any of the spawny roots with crowns will make plants. Seed may be sown to raise new ones, which will often produce the same kind. The seed may be sown in a fine bed of soil on a border, and covered with a hand-light till it is up.

The Strawberry.

There are so many varieties of the Strawberry that it has become quite confounding to know how to choose the best, for all are recommended for some good quality. But while we have some improved varieties in some particular points, there are many that fall short in other points of value which yet are commended. Well, I am of opinion that there are very few, if any, that can excel on all points Keen's Seedling and the British Queen. The first of these is a sure bearer, an abundant cropper, of hardy constitution, and good flavour. The latter is a robust Strawberry and a great fruiter; the fruit is large and of the finest flavour. These can be recommended, but I care but little for many others, although strongly approved. Both of the kinds named will bear a crop of good fruit under the most ordinary treatment, while I find some of the new and highly praised sorts are very reluctant to give a crop in some grounds.

The arrangement of Strawberry plantations requires some precaution as to the choice of soil and situation —a southern aspect for early fruit and a north-west aspect for a later crop. The Strawberry delights in a close adhesive maiden loam. This as a top-dressing for them is far better than any dung. The land should be half-trenched or dug fifteen or eighteen inches deep before setting the plants. Strong-rooted runners are best to plant.

The propagation of the Strawberry is simple. The first good runners that come should be laid on the surface of small pots filled with maiden loam, and either pegged on the pot or a stone laid on it to keep them from being removed. They will soon emit roots and fill the pot, and as soon as this is the case separate the runner or rooted plant from the mother, and remove the pots. After a week or so, shift these into 6 or 7-inch pots, and set them in a sunny open spot, and thoroughly soak them with water. Keep these plants clean of all runners: these are for forcing; for sale they may remain in the small pots. Runners will strike root freely in any soil, and are generally used for making Strawberry plantations. The seed may be washed out of the pulp and sown in seed-pans to obtain new sorts.

The Filbert.

The Filbert is a most desirable dry fruit, and being much in request, a high price has to be paid for it on account of its comparative scarcity. If, however, there was a fixed determination to grow this nut in this country more generally, we have ample means for doing so. In the West of England it bears abundantly, far above the produce of the northern counties, and much earlier; *i.e.* the plant bears much younger than it does in the northern counties. I took particular notice of this when I first came into the west, and the crop seems to be certain. This is easy to be understood, and the reason is that the climate is not subject to such severe frosts as in the north, which frequently destroy the flower, as it possesses no kind of covering to protect it against them.

I have noticed in the northern counties that in some seasons the fruit-bearing flowers get considerably in advance of the male flowers, consequently they die off long before the latter can develop their pollen, which when discharged in due time fertilises the fruit-bearing flowers. This disparity in the north is another cause

of a short crop, and often results in none at all. But in the milder western counties there is a more rapid development of the male flowers, which meets the case. As a consequence there are abundant crops of nuts annually. Here, then, is the field for growing the Filbert.

To plant a Filbert ground a spot should be selected sheltered from the sea, and protected from the cutting east winds. The soil should be moderately dry, and the plants should be placed in rows ten feet apart from row to row, and six feet from plant to plant. Clean two or three-year old plants should be used, and they should be planted in the early part of November.

The propagation of the Filbert is by sowing the nuts and by suckers. The nuts should be sown in the autumn or in February. If deferred till the spring, it is necessary to preserve them in a cellar or in some damp place, but to insure success sow the nuts three or four inches deep in drills of fine soil. After the first or second season plant the seedlings out in rows one foot apart; here they may remain for two seasons, then transplant them to where they are to be placed permanently. The suckers may be taken off in the autumn, and transplanted as for seedlings. The fruit comes on not less than two-year-old wood, therefore only the young wood must be pruned off in the pruning time, which should be in December or January.

The Walnut.

They say the more you thrash a Walnut-tree the better it bears. The reason is, that the Walnut bears its fruit on the young growth, like the Grape, so that by beating the nuts off the tree with a pole, and thus breaking the ends off the branches, additional growth is made the following season. The Walnut will not bear till the tree is of a good age, then it will do so successively for fifty or a hundred years.

Its propagation is by seed only. The nuts should be sown in deep drills, or dibbed in four or five inches

deep, putting them in holes one foot apart in lines, in a deep sandy loam.

The Mulberry.

The Mulberry is a useful tree, both on account of its fruit and its foliage. The leaves are much used as food for the silkworm. The tree itself is a fine lawn tree; its growth is noble and pretty, and the foliage very dense.

The propagation of the Mulberry is by seed, layers, and cuttings. The seed, which is obtained from the fruit, should be sown in deep seed-pans, and set in a mild heat in February. By layers is not very convenient. By cuttings of the two or three year old wood made as for Currant cuttings, and inserted in sandy soil in the month of November.

The Medlar.

The Medlar is a species of Pear, and may be grafted on that stock, as for that fruit. It may also be multiplied by seed. This is in the fruit, and can only be got out as it decays, or is ripe, for that is really the case with the Medlar. It is ripe when it is what is called "rotten." The seed should be sown in the autumn, in a good light soil, two or three inches deep. By grafting: use the young stuff, as for Apples or Pears, and proceed in the same way. It may also be grafted on the Thorn. The Medlar must not be gathered too soon, or the fruit will not be good.

The Fig-tree.

In some counties Figs are difficult to get, but in the mild climate of the West of England standard Fig-trees bear abundantly, and require no winter protection whatever, two good crops of Figs being easily obtained. The crop that comes late in the autumn ripens early in the following spring or summer. On walls extra fine crops are obtained without any kind of protection through the winter.

The propagation of the Fig is most simple. By layers it is very convenient, for the Fig is as easily layered as the Grape-vine, as it generally grows in branches close to the ground. Lay some of these in the ground as for the Grape-vine, and scrape the bark of the layer at a joint or bud on the upper side; this will check the sap, and induce the emission of roots more freely. The layering should be done in the autumn or early spring. By cuttings: these should be of the ripe young wood, six or nine inches long; cut above and below a bud, as for the Vine, will answer. Put them into pots filled with maiden soil and decayed dung and some sand, and plunge the pots into a mild bottom heat. The cuttings should be taken off with a heel of the last season's growth, and neatly cut over, immediately below the joint. Cuttings of this sort may be short, say six inches long; these will strike surely.

The Quince.

The Quince is a useful tree. The fragrance of the pear-like fruit is very agreeable, and the peculiar rough acid is also a most suitable adjunct in sharpening some jams, such as vegetable marrow, for pies, &c. The Quince requires a moist soil. It may be planted on west walls, and pruned and trained like the Pear, or even as an espalier. Generally the Quince is planted in some out-of-the-way place, where it is perhaps shut away from the sun and good air; but this is a great mistake for those who want fruit; it should be planted in a good open spot.

The propagation of the Quince consists in striking cuttings of the ripe young wood 6 or 9 inches long, cut off with a heel of old wood, in the month of October or early in November, at the base, immediately below the connection, and inserted in the ground as in the case of Gooseberry cuttings, &c.

By Layers.—Layering of the Quince is done in the autumn or spring. Bend down a branch, and, after trimming off the useless small spray, select the strong

growth for laying; open the ground and lay the branch in, agitating the bark (or cutting a small tongue) at a joint; peg the layers down fast, and cover the part to emit roots with some fine soil. Seedlings may be raised from the pips (see the Pear, p. 150).

Grafting may be resorted to as a quick means of getting Quince-trees. Graft them on the Pear stock precisely as for Pears. For standard Quinces the stems must be tied to a stake, to prevent them from growing crooked.

ON THE PROPAGATION AND PLANTING OF HERBS.

The Sage.

The propagation of the Sage consists in taking cuttings of the young wood in May or the beginning of June. Let them be of the firm stout young growth, 5 or 6 inches long, cut clean below a leaflet, and insert them in the ground in a shady border of good soil with a hand-dibber. Sage seed may be sown to raise plants from, but I find such plants are more liable to run to seed than those which are raised from cuttings. The seed may be sown on a warm border, or in a seed-pan, and transplanted out afterwards. The Sage delights in a shady, damp place; it requires replanting every two or three years, or it will get barren.

The Thyme.

There are several sorts of Thyme, but two only are used for domestic purposes. The upright French Thyme is preferred to all others; it is very strong and hardy, although it prefers a friable good sandy soil and a dry subsoil. The other is a trailer, or procumbent plant, and is lemon-scented; useful in some

kinds of cookery, but the French Thyme is by far the best for stuffing purposes. The Thymes require good soil and an open space, and to be replanted every second or third season. Take up the plants in September or March, and part them if they are large, and then dig them in, laying them in up to the young growth.

Thyme may be raised from seed sown on the surface of fine earth, on a warm border, in March or April. Make the surface of the bed fine with the rake, and then sow the seed thinly over it, and gently touch it in with the back of the rake, or draw the back of the spade over the surface; this will bury the seed quite deep enough. As soon as the seedlings are 2 or 3 inches high, plant them out (6 or 9 inches apart) in good fine ground, and water them if the weather is dry.

The Marjoram.

There are two kinds of this herb in domestic use—one called "pot Marjoram," a perennial; the other "sweet" or "knotted Marjoram," and this is really an annual, and requires sowing every spring. The former is a hardy perennial, and may be propagated by seed and by division of the root; but the "sweet Marjoram" is most in use, and should be cut during the summer, when it is in perfection, and dried out of the sun. The seed may be sown on a warm border in April as for Thyme; it should be planted on good light ground, and in an open spot.

The Savory.

There are also two kinds of Savory in use. There is that which is called "Summer Savory," and must be sown annually as for the Marjoram; and the other, which is termed "Winter Savory," because it is green all the winter. Each of these is much used for flavouring soups, &c. Their propagation and after-treatment are the same as for the Marjoram.

The Mint.

There are two kinds of Mint, but they are used for quite different purposes. Lamb or Spear Mint, the leaves of which are long and very narrow-pointed, is the only one used in cookery; the other is most useful as a medicine, and no one, rich or poor, should be without a good bed of Peppermint. This has quite a different flavour from that of the Spear Mint, and does not answer the same purpose. Mint should be re-planted on good light land once in two years, and be top-dressed with rotten dung every November.

Basil.

There are also two sorts of Basil in use, but they are much the same, both possessing a Clove flavour, and are much used by good cooks for flavouring soups. Basil must be sown annually in seed-pans, and trans-planted out on good ground on a warm border after-wards. Sow the seed in February or the beginning of March, and set the pans on a mild heat; harden off as soon as an inch high, and plant out in May, 6 or 9 inches apart. It is an annual.

Tarragon.

Tarragon is a herb not much in use, but it is occa-sionally employed for correcting other herbs. It should be used green. It is a perennial, and may be raised from seed or multiplied by division of the root. Plant it out on poor ground in an open space.

Tansy.

This is a beautiful-foliaged plant, and possesses a very peculiar scent. It is often used to flavour soups, as well as for medicinal purposes. It is a hardy peren-nial, and will grow in almost any soil. It may be propagated by division of the root.

Rue.

Rue is a useful antidote against infectious diseases. If any one puts a small sprig of the plant in the mouth before going into a room where there is fever, &c., the disease, it is said, will not affect the visitor. Rue is a warm tonic, and will create appetite. The plant may be multiplied by seed and by slips in the months of May and June. It is a very pretty-growing evergreen shrub, and might be used as an ornament for borders among other dwarf shrubs.

The Hyssop (*Lamiaceæ*).

The Hyssop is a useful and beautiful little plant, of a dwarf habit, and belongs to the same order as the Thyme. It may be raised from seed, and propagated by cuttings put under a handlight, and by division of the root, as for Thyme.

Lavender.

The Lavender is well known, the flowers being the useful part. These make a fine distillation for various purposes; or the flowers may be dried and put into muslin bags, and laid among clothes as a preventive against moths entering the box or drawers. The cultivation of the Lavender for commercial purposes pays very well on good, open, light land. The plant will live for a great many years, and produce an abundant supply of flowers every season, if the land is dry or well drained, and exposed to the full influence of the sun. The flowers should be cut as soon as they are fully expanded, and never left a day longer: they should be also thoroughly dry before cutting them.

The propagation of the Lavender is by slips or cuttings of the old and young wood. Cuttings of the young firm wood in June under a handlight, and slips of the older growth inserted in the ground in August or September, will make good plants.

By Seed.—The seed may be sown in the spring in deep seed-pans, and raised under glass, or sown on a warm border of fine soil.

The Rosemary.

The Rosemary is a very useful medicinal herb: a sprig of this put into boiling milk and drunk when going to bed will relieve a bad cold. The propagation of Rosemary is by slips, cuttings, and seeds, as for the Lavender.

The Caraway, Dill, and Coriander.

The above are all grown chiefly for their seeds, which possess a warm aromatic nature, and are used in medicine, for drinks, and in cookery. Each must be sown on fine ground annually in the month of April.

The Parsley.

Every one knows what Parsley is, but I would just say that every one does not know how to grow it, for it is often put in the wrong place and sown at the wrong time. To have good Parsley without running to seed the second season, it should be sown on well-drained land about the end of May or the beginning of June, and not before; nor must it be buried more than half an inch deep.

Chervil

Is very similar to Parsley, and is used for much the same purposes. It should be sown in the same manner as Parsley.

The Rhubarb.

Rhubarb should be planted in good deep land, and well dressed annually with strong manure. It may be raised from seed, and propagated by dividing the root,

securing a crown to each piece taken off. The seed may be sown in seed-pans and raised on heat, being planted out afterwards, or sown on a warm border in the spring in drills. If Rhubarb is allowed to remain on the same ground undisturbed for three years, it generally degenerates and throws up flower-stems, which prove very deteriorating to the roots.

Artichokes.

The Artichokes I refer to here are the ones belonging to the class of compound flowers with thistle heads—the *Cynara* genus. This species is grown only for its heads, which should be cut as soon as they have well filled up the numerous calyxes with flesh, and before they begin to separate from the bud, or the least sign of the flowers appears. They should be planted in good and deep soil, 3 feet apart, and earthed up a bit in severe weather to protect the plants from frosts, and should have a covering of long dung or ferns over them during protracted frosts. In the spring the banks should be thrown down, burying the manure about the plants. They are propagated by suckers in the spring of the year.

Garlic, Shallot, and Potato Onion.

The two former should be planted every February, or in the beginning of March, in good ground in an open space, in drills 1 foot apart from row, to row and 6 inches in the drill. Single bulbs are sufficient.

The Onion should be planted in January, in good light rich land, in the same way as the Garlic and Shallot. The Onion will be ripe for use or housing about midsummer, and should be tied up in bunches, and then suspended from the roof of some cool, airy outhouse.

BOOK VIII.

CHAPTER ON SOILS, MANURES, ETC.

THE technical terms used for the various descriptions of soils are frequently misunderstood, and this sometimes proves detrimental instead of being an advantage. Peat, for instance, is a term much misunderstood, even by young gardeners. Peat has three distinct meanings, and this fact makes a material difference when applied to the cultivation of plants, especially those that really refuse to grow in two of the three sorts of peat; so that it is of more consequence to know what good peat is than it may at first appear. There is that which is procured from bogs; but this has nothing to do with the peat referred to in this work, nor in any of my books. Some recommend this kind, but it is of little or no use for plant-growing, except for some Orchids. Few things indeed will do any good in it. It is so soured that no good plants will grow freely in it, and even such as Heaths, New Holland plants, and Camellias will pine away. Again, there are two other kinds of peat, one of which is not good; this is composed of minerals very detrimental to some choice plants. I found this out by experience before I was well aware of the thing, and paid for it bitterly. This peat appears to be good, but possesses more or less mundic, and is obtained from mining districts, such as Dartmoor and other mineral localities.

Heaths will pine away and die in it, but the Hydrangea will produce the blue sort to perfection if grown in it.

The other class to which I refer in this work will not only grow Heaths, but everything else, even Cucumbers; and when peat will do this it is composed of rich and nutritious qualities, and is also free from impurities. If a Heath will not grow in peat, it may be looked upon as not safe for other plants; for it certainly possesses some dangerous compound in the way of a mineral, or is poisoned by supersaturation with mineral waters, &c. The peat alluded to in this book is plentiful enough, but some distance has often to be gone to get it. Epping Forest (around High Beech), Wimbledon Common, &c., are the best places to obtain it, but a few sacks of it can now easily be had by railway. This class of peat, when handled, feels plum, and does not contain great stones nor coarse sand, but it adheres slightly together when pressed with the hand, although it is dry. But the other peats are harsh, and the Dartmoor peat contains coarse sand, and will not cling together under the same circumstances.

Maiden Loam.

"Maiden loam" is a term easily understood, but the quality of it is a frequent source of anxiety to amateurs. By "maiden loam" is meant the top spit from a breify common or a pasture. The best kind possesses a nature similar to that of good peat, except that it contains no sand, and bears good grass and herbage. It will grow Cucumbers and Melons without any addition to it. The best I ever knew came from the Lower Epping Forest, although good maiden loam can be had in most localities. I need scarcely add that the term "maiden loam" implies that the top soil has not been cropped beyond the natural herbage. This soil, as well as the peat, should be dug up during the early autumn, turf and all, in solid spits, and packed up in stacks, turf downwards, out of doors—not under trees, but in an

open spot where the sun and free air can get to them. Whenever any quantity of either is required to put into the potting-shed, as much as is wanted should be cut clean down off the end in a perpendicular manner from the top of the heap to the bottom; it should never be taken off the top only, thereby leaving the under part to get saturated by the rains. There is another kind of loam which comes out of pits, which is tender, and good for dressing some gravelly and drying soils, which is very retentive of moisture.

Leaf-Mould.

Leaf-mould is a most important and useful article in gardening. It may be procured from under trees and where the leaves fall from the trees and get blown together into heaps under the brushwood, where they decay; but this leaf-mould is scarcely safe to use for pot plants, seed-pans, &c., on account of its liability to harbour embryo insects, which often hatch quickly after they get into the warmth of a frame or house, and fill the structure with myriads of various insect pests, especially the wood-louse and red spider. I have found it so. The safest method of getting pure leaf-mould is to pack up all the leaves possible in a heap in the fall of the leaf, and to let them remain to decay, turning the heap two or three times in the course of the year. Or the leaves may be used to grow Marrows or Cucumbers on during the first season, when they will decay and come into use for pot-plant work in the following spring—*i.e.* the spring twelve months after the fall.

Any leaves will make leaf-mould, but those of the Oak are preferable, being stronger, and perhaps containing less injurious matter. Successful gardening cannot be done without peat, maiden loam, and good leaf-mould. Leaf-mould must be used for raising seedlings, and also in some cases for delicate bedding plants, as an addition to the original soil; and in the composition of fresh-made beds to suit the thing in

hand. This I have found to be the case. Success in the flower-garden cannot be looked for unless the soil of the bed is adapted to the nature or constitution of the subject.

Cowdung.

Old pulverised cowdung is one of the most useful adjuncts possible in choice flower work. In the cultivation of Auriculas, choice Polyanthuses, Primulas, and even Geraniums, this is most beneficial in conjunction with maiden loam, &c. Every one who has a collection of plants, whether great or small, should procure and lay up in a round heap a load of cowdung every season, so that there may be no lack of it. It will require not less than two years for it to pulverise, and if it is four years old so much the better. The heap should be turned two or three times a year. Two parts of this and one part of good maiden loam, and one part of silver sand, will grow Auriculas and the Primula Sinensis to perfection. This is much better than leaf-mould, more nutritious, and answers the same mechanical purpose.

Sheep's Droppings,

laid up until very old, are excellent, in conjunction with maiden loam, for various plant purposes, as well as in the fresh state for watering Roses and Geraniums; also for Auriculas and late Primulas. The liquid manure made with this is no doubt one of the best—if not the best—that can be used to bring up a first-class flower, and insure a good colour. Put a peck of fresh droppings into a tub holding 5 gallons of water, and fill the tub up; then with a broomstick stir the contents well, and do so again the following day; then let it settle, and dip the clear liquid out as wanted. Give the plants a good watering with it once a week till the flowering is over, when it may be discontinued for the season. Do not plaster the top of the pot containing a plant over with cowdung, nor with sheep's droppings; some do this, but it excludes the fertilising properties of the air,

which are equally as beneficial to the root as to the branches. Giving manure in the liquid state is by far the most beneficial, and produces immediate results, while at the same time it admits the action of the air to the root of the plant. The tub containing this manure should be set so as to get the free air out of doors.

Fowls' Dung.

Fowls' dung is, no doubt, equal to some guano. Its application to crops we find requires care, for too much of it burns them up, as the saying is. The best application of this manure is in a thoroughly pulverised form, mixed with wood ashes and sifted. This, sown at the rate of 2 or 3 pounds per rod on turnips as soon as the crop is up, will prove a fine preventive against the fly, and act as a rare stimulant to the crop. In a thoroughly pulverised state it may be mixed, in a small proportion, with the soil for potting Roses, Fuchsias, &c. It may also be dug into the ground in its fresh state for Onions, Leeks, Celery, Cabbage, &c.

Rabbits' Dung.

This proves a very good dressing for lawns, as it produces fine herbage—*i.e.* of a fine and not a coarse texture. I have particularly noticed this, while, on the contrary, cowdung acts in the opposite manner. This manure, as well as fowls' and pigeons' dung, should be mixed with some earth, and allowed to lie in heaps for some months before using it, when it may be used on the garden for flowers and vegetables, especially for Onions, Celery, Cabbage, Broccoli, Roses on their own roots, the Gladiolus, Pæonia, &c.

Night Soil.

What a waste to the community is the system of washing away the common sewage into the Thames and the sea! We get rid of this, and then are obliged to have recourse to the manufacture of all sorts of

stuff for manure not worth so much by 50 per cent. as the contents of the common sewers. Night soil is one of the strongest, if not the strongest, manures it is possible to get. I know that the Boards of Health have many scruples, and offer numerous objections to the contents of the common sewers being brought aboveground in the neighbourhood of a large population, and think by keeping it underground to avert disease and death; but I take particular notice that we have quite as much disease and death now as ever we had, even where £50,000 have been spent to carry the sewage of the town away underground into the sea. No harm can or will come from the exposure of night soil if some gypsum is put into it or thrown over it as soon as it is aboveground, and it is then covered over with earth. Empty the cesspools during December, when the evaporating power of the air is less than at any other time, and use the gypsum as a fixer of the ammonia; let it lie exposed until March, when it may be put upon the ground for Onions, Leeks, Cauliflowers, and Cabbage.

Night soil may be taken from the cesspool, and carried forthwith and put upon the ground occupied by Gooseberry-trees with great advantage. It will not injure the trees, but prove amazingly beneficial in the production of fine fruit. This is what my master used to do, and I am well acquainted with the results. It may also be wheeled direct from the cesspool to the ground to be cropped with Onions, and there and then spread over the surface, where it may remain till March, when it may be dug in for the crop. In a pulverised state it will prove equal to guano for a top dressing, and may be sown over Turnips and drilled in with them, and also with Mangel-wurzel.

Bone Manure.

Decomposed bones are a fine manure for all purposes, and may be used in small portions mixed in the compost for pot plants. The constitution of this

manure is very lasting and feeding, on account of its slow decomposition in its pure state; crushed bones, for instance, are perhaps more lasting than anything else, but in conjunction with alkalies or acids they do not last so long. Even then, however, bone manure is better than guano, and does not exhaust the ground as that does. Guano contains so much stimulant that it drives the plant too fast, so that it draws heavily upon the ground; consequently the land frequently will not grow a second crop without a good dressing of manure being put on it. Bone manure, however, will give a second and even a third crop; but a great deal depends, of course, upon the quality of the manure. Some kinds contain but a small proportion of bones, and are made up of ashes, soot, and alkalies. If a pound of proper bones is compounded with four pounds of alkalies of various constitutions, it will make a good manure; and if acids are used as solvents, and the bulk made up with good alkalies—such as wood ashes, dissolved fish-shells, chloride of lime, lime, soot, &c., a very strong and lasting manure will be the result.

Bones may be either dissolved with chloride of lime or sulphuric acid. When dissolved with the latter a more lasting manure is no doubt the result, because not so volatile; but much depends upon the fixed principle of the volatile agents. Gypsum may be added with soot to fix the ammonia. Every pound of bones dissolved is worth one shilling. This pound of pure bone dissolved with an acid will make ten pounds of compound manure fit for use, diluted with soot, ashes, &c., and will be quite as strong as guano, and more lasting.

Every farmer can make his own bone manure easily enough. Put the bones into a pan, and pour sulphuric acid on them; dissolve, and add soot, ashes, and gypsum; mix together, and let it remain for a few weeks.

The Fertilising Power of Soot.

Soot is, no doubt, the most powerful ready-made manure we possess; it is, moreover, a good insecticide. If in the early spring Gooseberry-trees are liable, as they often are, to the depredations of the caterpillar, which insect frequently destroys whole crops by eating all the leaves off the trees, it is a good plan to go over the whole plants, and sow a good dressing of soot completely over trees and ground before the leaf breaks out, and again as soon as the leaves are developed. Never mind about the look; no detriment will accrue to the fruit, nor will the fly deposit her eggs on the leaf, for it does not like soot.

Two pounds of soot and two of salt, mixed together and sown on one perch or rod of ground, dug in and well mixed with the soil, is the best manure I know of for Carrots—in fact, it is quite equal to bone manure. I tried the two side by side. I had the best crop of Carrots I think I ever saw from this manure; the land was light.

One pound of salt and two of soot, sown over one rod of ground, will produce a fine crop of Potatoes. Two pounds of soot, sown in the trench when the Potatoes are planted, will grow a good crop.

Three ounces of soot and six ounces of guano will produce finer Rhubarb than any other manure extant, and more quickly too. Apply it in a liquid state just before the crowns break, and once after the first pull of the crop. A thorough soaking to the roots with this is necessary each time.

Soot alone, sown at the rate of two pounds to the rod over young Cabbages in the months of February and March, is proved to be one of the finest stimulants possible in the production of these most desirable vegetables, giving them a beautiful rich dark green.

Soot alone, sown over grass during March and April, in showery weather, proves one of the most active agents in producing a large crop of hay; one pound per rod is enough.

Soot and wood ashes, two parts of the latter to one of the former, will be found equal to guano in producing a quick crop of Turnips, sown broadcast at the same time as the seed, or drilled in with the seed, or sown over and harrowed in after the seed is sown.

On Natural Soils.

There is a general idea that it is of no use to bring up to the surface the subsoils of some sorts of land; for, say those who are against it (and they are usually farmers), the unproductive nature of poor gravelly lands renders the subsoil of no use on the surface. Now it is quite the reverse; for if the land is gravelly and poor, the only effectual remedy, as a fundamental policy, for renovating such worn-out land, or for forming a permanent foundation for new land of this class, is to fetch up to the surface, by deep digging or deep ploughing, the poor subsoil, so that it may be fertilised by the influences of the sun and the air. And be it remembered that if the land is shallow and light, the deeper it is dug or ploughed the better are the chances for a good crop, because it will go down into the good soil below, and this is where all crops derive their sustenance, and whereby they live. I have proved to my own satisfaction that deep digging and deep ploughing are nearly as good as a dressing of manure. On very light land the deep ploughing and digging should be done some time previous to cropping, especially for Wheat or Strawberries. I use these two as illustrations—for farming on the one hand, and gardening on the other. Each of these requires solid land to get a good crop on light land, and, as a rule, the lighter in texture the less time will be required to settle the land after digging or ploughing; or rather heavy land may be allowed a freer drainage than light. I am more than ever convinced that all lands should be dug or ploughed deep once in the season.

It is a great mistake, in either farming or gardening, to pick out all the stones from land that is

naturally stony. Stones are active agents in promoting heat and retaining it: some lands would be greatly benefited by stones.

The most productive and profitable land is one possessing a subsoil of sandy clay of a tender texture, with a surface soil of a breify or mellow texture. This sort of land is peculiar in working; if wet immediately follows after it is ploughed, or it is dug before it can dry, nothing can be done with it by way of sowing seed for some time. Such land must be either cropped at once, or it must lie until it has thoroughly dried, and gets softened by a rain; then no land can equal it for working or for producing a good crop. Heavy lands are benefited greatly by a dressing of coarse sand, tan, and cinder ashes. This kind of land should be carefully managed, watching for fine weather to plough or dig it; but light, sandy, and gravelly soils may be dug or ploughed even during wet weather, and are even benefited by it, as it induces a closer texture —for the season at any rate.

The Action of the Air upon Soils.

The fertilising power of the air upon land may be attributed to the influence of the nitrogen gases which compose oxygen and carbon, forming carbonic acid gas, the chief fertiliser of the land. This influence is more readily exerted beneficially upon land exposed to the air by turning it up frequently. Thus land that has been heavily cropped and run out, as we say, will recover itself so as to bear good crops merely by rest and frequent ploughing and digging. The fact is, let the land be ever so unkind in its nature, it can be made fertile by judicious management; and the deeper it is dug or ploughed, the more fertile it will be. But it is necessary to dig or turn it up to the light and air at every sowing; and, as a rule, the longer it is exposed to atmospheric influences before sowing, the better, especially in the case of heavy lands. These should be turned up several times before cropping;

this is even better than manuring and not turning the land so much.

I have seen what might be called poor land bear fine crops of Wheat with simply frequent ploughings and a rest; and I have seen land that was manured and turned up and cropped forthwith bear but a poor crop. Heavy land will bear most abundantly without manure if often turned up to the influence of the air. It is a mistake often made when land has lain uncropped, or half cropped, or half tilled, and so on. Let the man who takes such a farm go into the deep ploughing and turning the land up to the influence of the air, and he will not regret having taken what was called a worn-out farm. So also in gardening.

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PRINTED BY VIRTUE AND CO., LIMITED, CITY ROAD, LONDON.

THE TREE PRUNER

THE TREE PRUNER

BEING A PRACTICAL MANUAL ON

THE PRUNING OF FRUIT TREES

INCLUDING ALSO THEIR TRAINING AND RENOVATION, WITH THE BEST METHOD OF BRINGING OLD AND WORN-OUT TREES INTO A STATE OF BEARING

ALSO TREATING OF THE

PRUNING OF SHRUBS, CLIMBERS, AND FLOWERING PLANTS

WITH NUMEROUS ILLUSTRATIONS

By SAMUEL WOOD

AUTHOR OF "GOOD GARDENING," "MULTUM IN PARVO GARDENING," "THE GARDEN OF BULBS," "THE TREE PLANTER AND PLANT PROPAGATOR," ETC.

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INTRODUCTORY REMARKS.

It is now upwards of forty years since I was put to the pruning and training of the Peach, and other fruit-trees, and more than thirty-six years since I was called upon by a gentleman to renovate a set of wall trees which had gone into a state of dilapidation. Said he, "Do you think you can make anything of them?" I replied that I could do so, and may say, without boasting, that I did do so, to his astonishment.

The inducements I have had to write this work have been various. I know that there have been many who have given directions how to prune the Peach, &c., but their works are either too deficient in illustrative examples, or so elaborate as to be beyond the reach of most of the young men who are trying to learn this essential branch of good gardening. Few among our young men can now afford to give so much as thirty, twenty, or even fifteen shillings for such a book.

One great reason I had for writing this book was the miserable and defective method of pruning generally adopted nowadays. I see this almost everywhere I go, and deplore it. I have a garden now under my care, with a splendid brick wall 400 feet long planted with Peaches, which has been managed by several professional gardeners, not one of whom, however, knew how to prune a Peach. I see from the trees on this long wall that men may know how to plant and grow a tree, but that there are comparatively few who can prune well, or perhaps even at all.

Another object I had in view was to furnish such of

my young friends as are at a loss to know how to overcome the difficulties they frequently meet with in the various kinds of pruning, with a book of the necessary instructions, pointing out to them the proper methods in the case of all classes of shrubs and plants.

The method, the time, and all the requisite details, I may venture to say, are laid down under the various heads, and the work may be, I believe, relied upon as a safe guide for the young gardener, as well as for some of the old ones too, and also for the amateur lady and gentleman gardener.

It will be seen that I have adopted the "oblique double cordon," on what I think is a somewhat improved plan, which will accommodate itself to a class of wall more often to be met with than that which is attached to the great mansion. There are a number of dwelling houses, the small gardens of which are fenced with low walls—too low for training fruit-trees in the fan-shape fashion. The "oblique cordon," then, herein illustrated and especially treated of, is the thing for them. It will be seen that by adopting this useful and accommodating plan of growing Peaches, Nectarines, and Apricots much less judgment is needed in pruning—winter pruning—than is required in the fan-shape style; and it is no doubt more under control. Moreover, a larger amount of fruit can be obtained from a given space.

There are many old favourite Pear-trees of a choice kind trained on walls, which have done well, but now refuse to bear fruit, simply because all their fruit spurs are exhausted; and there they are, useless relics of their past goodness. Here, then, I offer the only conditions by which such trees can be restored to fruit-bearing, and finally become as useful as ever.

In conclusion, I venture to express a hope that the result of my present effort will be to raise the Art of Pruning to the high level of the other branches of horticulture and floriculture.

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THE FRUIT-TREE AND SHRUB PRUNER.

PART I.

THE PRUNING AND TRAINING OF FRUIT TREES.

CHAPTER I.

THE PEACH.

Fig. 1 is a maiden Peach-tree one year old. This rod may remain nearly entire except that a few inches may be taken off the top; and if the tree is planted on the wall in the month of November it may certainly remain as a nucleus for Figs. 2, 3, and 4. This manner of training has many advantages peculiar to itself: first, as much fruit may be had from low walls as from walls twice as high, as by training them obliquely much more wood can be commanded in order to produce fruit; and by this method of close cordon training a greater number of trees can be planted on the walls—instead of the trees being ten or fifteen feet apart, these cordon trees may be planted two feet asunder, by which means more fruit (and much finer too) may be had from the same space of wall.

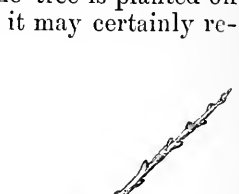

Fig. 1.

41

Fig. 2 is the Peach with one year's laterals. When No. 1 begins to break bud some little care will probably be required in watching how the buds are likely to break. Some may be too weak and some too strong, and there will probably be too many. In such cases thin them out by disbudding, rubbing off those which are too bold, or else they will get the advantage of the weaker ones, and prevent them breaking at all, so that a defective tree will be the result.

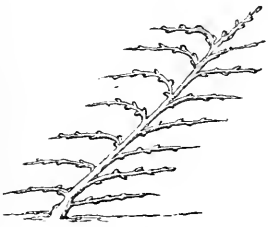

Fig. 2.

It is of the utmost importance to attend to the forming of a Peach-tree at the very outset; the foundation of the future tree must be well attended to in the maiden plant. Some very popular writers tell me that it will require seven years to produce a perfect Peach-tree. This to me is monstrous; and I think it will not appear at all unreasonable if I can show, by the method here adopted, that a full-developed Peach-tree can be fairly obtained within four successive years from the planting of the maiden tree, and this is applicable to both the old fan-shaped and the cordon tree.

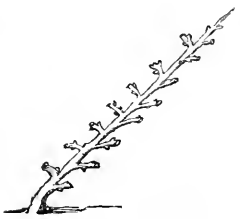

Fig. 3.

As soon as Fig. 1 has well broken bud and made three or four inches of young growth, stop each lateral; then there will succeed two other laterals, which will make equal progress, ripen, and no doubt will be well furnished with fruit buds by the following autumn. But as the young tree is not sufficiently established to bear fruit on all these laterals, cut one of them back to a bud as seen in Fig. 5, and shorten the remainder

a little. Thus an oblique cordon Peach-tree capable of bearing some fruit may be obtained within three years; but unless the tree shows unmistakable signs of a good constitution, not more than one dozen of the fruit should be allowed to remain to ripen on each tree. As a rule, Peach-trees on good wall borders out of doors are generally too strong in growth for the few first seasons, and require some taming down, and I know of nothing better than allowing them to bear fruit early to do this. It is even better than lifting them to check rank growth.

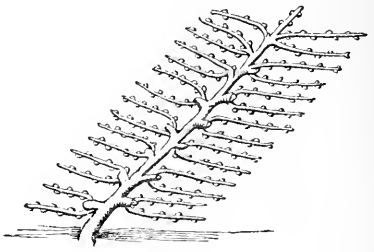

Fig. 4.

Generally Peach-trees will grow too strong if the land is strong and rich. In such cases it is quite a mistake to cut back young trees with a view to making them bear fruit; and there is no better class of tree to manage than the upright or oblique cordon: first, because of the control one has over it by way of lifting it, if not manageable by virtue of stopping, and so induce the tree to give fruitful laterals by laying them in thick; secondly, more trees can be planted on the same space of wall. This I have remarked upon before.

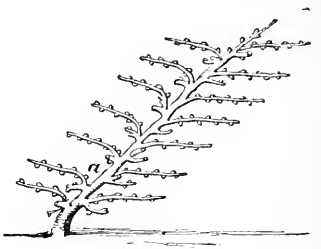

Fig. 5.

Now if Fig. 2 should be growing upon light and rather poor soil, the probability is that the first season's wood the maiden tree makes will be quite the reverse, and the buds will be weak and the laterals poor; if so,

let them go unstopped, and then cut them back as seen in Fig. 3. The consequence of this will be two laterals the following season from each spur, as seen in Fig. 4. In order to maintain the perpetual character and constitution of the tree for many successive years, one of these two fruit-bearing laterals must be cut back every season, as shown in Fig. 5, and one to succeed it must be provided from the spur *a* all through the tree each succeeding year; and if the tree at this or any earlier stage should prove of too strong growth, and produce wood deficient in fruit buds, which may be easily seen by the end of the growing season, then dig round it carefully, and lift it, afterwards filling up as before; but, as I have observed already, when trees are too strong in growth, allow them to bear more fruit, and I can vouch for a more congenial and quiet growth as the consequence.

If the laterals in Fig. 2 are allowed to remain at nearly full length, as they may if of a good medium character, then every alternate bud giving a sublateral may be nipped in as soon as it has made three or four leaflets. This will have the effect of furnishing the first primary laterals with abundant fruit spurs, and thus a cordon tree will be formed which will be a complete bouquet of flowers, and capable of bearing any amount of fruit. This is a good way of possessing a command over a Peach-tree at pleasure, for if the tree gets too weak do not let it bear so much, and *vice versâ*. By either of these three methods of forming cordon Peach-trees it will be seen at once that a good permanent fruit-bearing plant can be obtained within four successive seasons from the planting of the maiden tree, Fig. 1.

Fig. 6 is an example of a fan-trained Peach-tree four years old from the planting of the maiden tree, which has been well pruned and trained each successive season. Now why some popular writers on the Peach require seven years to do this I am at a loss to understand. I am prepared to prove that this is three years' loss; not only so, but much valuable wall space is also lost by the miserably slow process of obtaining a well-

developed fan-trained Peach-tree. The process of controlling the growth of these trees is different from that in the case of the "cordon tree," for it is rather inconvenient to lift an established four-year-old, well-developed fan-trained tree.

Now I think that just here I cannot do better than give my own experience relative to the management of such trees. I once had the care of a fine lot of Peach-trees in a most luxuriant condition—too much so, for they made too much wood, and little fruit could be got from them. They had been too freely thinned out, too severely pruned. "Well," thought I, "this will not do;" so, instead of pruning them so much, I laid in all the young wood that I possibly could, and the result was

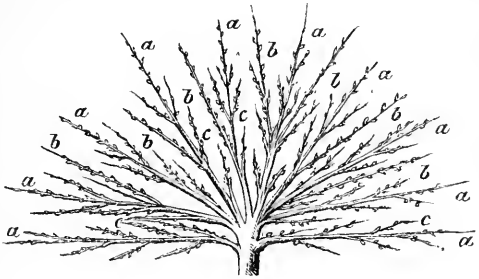

Fig. 6.

a complete taming down of the growth of them, and many dozens of fruit on each tree, which had to be discarded every season afterwards. There is no doubt that this is the proper management of over-luxuriant fan-trained Peach and Nectarine trees. I care not how luxuriant a tree may be, my object is to get it fully developed as soon as I can reasonably do so, and then I will control it according to its constitution, let that be strong or weak.

Fig. 7 is an example of a Peach-tree badly managed. Now, perhaps, some would not so regard it, from what I have witnessed of late, much to my regret; but no good practical hand will call it a good specimen of Peach culture. The chief fault among partially expe-

rienced and novice Peach-tree managers is, that nine out of every ten of them do not actually study the constitution of each plant, but prune without knowing whether the tree should be severely treated, moderately done, or not pruned at all. They serve all alike, and generally speaking, among amateurs who keep a cheap gardener, Peach-trees go to ruin within three or four years for want of proper treatment.

Frequently, too, fan-trained Peach-trees get barren as regards fruit-bearing wood in the body of the tree, and only possess it towards the extremities, because the pruner is afraid to use the knife to keep the tree at

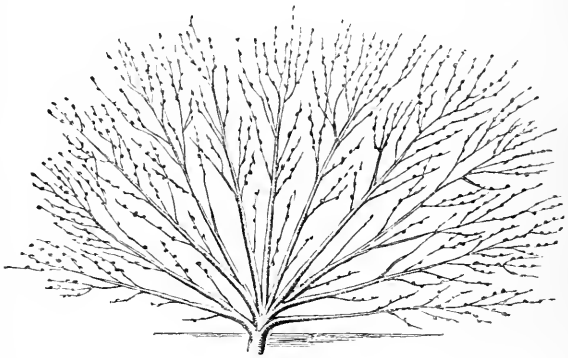

Fig. 7.

home; and in course of two or three seasons the tree is nearly past cure. But let me advise the young gardener by no means to be timid about using the pruning knife at the extremities of the tree. All trees, and especially trained wall Peach-trees, are prone to make more fruit-bearing wood towards the ends of the branches than towards the root or at the base of the branches.

Then young hands and inexperienced amateurs think it "a thousand pities" that young wood should be cut off; hence the tree rapidly deteriorates and arrives at the condition of Fig. 7. But if the principle of Fig. 6 is carefully followed up, the tree will never get out of

order during the many years (twenty-five or thirty) of its existence, provided that contingent circumstances admit of so long an existence. These circumstances comprise certain precautions: first, in the due preparation of the border, which should be thoroughly drained, and elevated fully six inches above the ground level; and secondly, the border on which the trees are planted should never be dug with a spade, but with a short digging fork, nor should it be dug more than seven or eight inches deep. This depth will be quite enough, just as for early radishes, dwarf beans, or potatoes. An incalculable injury is done to the trees when the ground is dug deep with a spade. The roots are lacerated, bruised, and sometimes fearfully maimed. The consequence is that suckers are thrown up about the collar of the plant, the trees gum, and death ensues before they have come to what may be called maturity. The mischief is almost past remedy, but more of this in due time.

If Fig. 7 is not past age, and possesses only a few buds of young wood in the body of the tree, my advice is to cut it back at once without hesitation like Fig. 8,

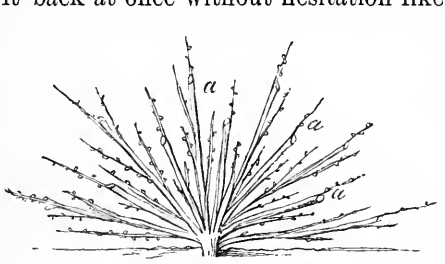

Fig. 8.

when a new tree will be obtained like Fig. 9. It is possible that a strongly constituted tree will make very vigorous growth the first season after cutting-in so severely. In such a case lay in all the young summer growth possible, as well as in the winter also, till the tree gets tamed down a bit. When it possesses a good stock of fruit-bearing wood treat it as you would Fig. 6.

In pruning Peach and Nectarine and other wall trees be careful to have a fine, thin, keen-edged pruning knife. I mention this because I find young hands who have not been well trained frequently use knives too large, too much of a hook shape, and not possessing a thin blade, nor sufficiently keen-edged to make good clean work in this kind of pruning. The consequence is, that the cuts being often left with a fractured edge, they frequently split, and the result of all this has a fatal effect upon the tree.

In cutting a tree back like Fig. 7 saw the thick branches off carefully with a fine-toothed pruning saw,

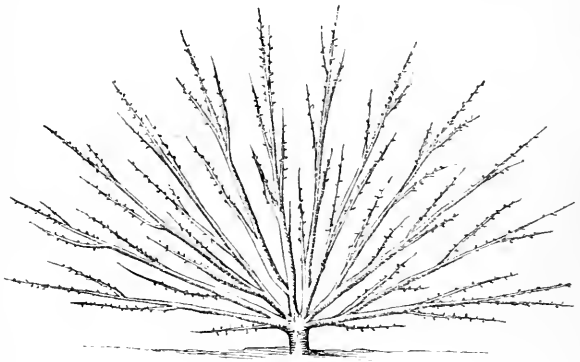

Fig. 9.

close to the base of a young piece of wood (see Fig. 8, letter *a*. Then smooth over the saw-cut with the pruning knife, and if the limb is larger than one inch in diameter paint the cut over with some grafting-wax made of pitch, mutton fat, and bees'-wax—1 lb. of the pitch, 2 ozs. of the fat, and 2 ozs. of the wax melted together in a pipkin over a slow fire. Put this on when it is just warm enough to spread with a brush; this will keep any water from getting into the heart of the branch, and will prevent decay.

Now, without going into modern and comparatively unknown technicalities, which are of little or no use to a learner, I beg to observe that when a Peach-tree, or in-

deed any fruit tree, makes wood of a fruitless character, do not cut it much, but lay in more wood during the summer growth, and I can vouch for success in bringing any tree into a good fruit-bearing state.

Some think that if a Peach-tree gets into the subsoil it will not bear fruit. I confess that if the subsoil is of a cold retentive clay, and lying upon a flat, the chances are much against it, and also against the well-being of the trees themselves. But who would plant trees of this sort on such soils without first draining them, and otherwise preparing them for Peach-growing? No one. Then I contend that no one need fear on account of fruitless Peaches getting into a good, well-drained subsoil.

Training Peaches on Walls.

In the case of the "*cordon* Peach-tree" a certain amount of constant training is a principle that cannot be departed from, especially if summer pruning is literally carried out; for then not only the main leader will be a permanent thing as long as the tree exists, but the laterals will be of the same character also. But in the case of the fan-trained tree permanency will soon prove ruinous, because they, like all others, run to the extremities, and even more so. Moreover, they cannot be controlled so easily without cutting back, unnailing, and replacing the wood extracted from the tree every season. It is this permanency in fan-trained trees that ruins the Peach-trees on walls.

In pruning a fan-trained Peach, let the novice be careful to attend to the unnailing, cutting back the most prominent leaders of the tree, and maintaining the character of Fig. 6 and Fig. 9, whether the tree is young, medium, or old, and also to train his trees accordingly. The first thing to do, when a tree is to be trained uniformly (and it may as well be done so as in an indifferent manner or irregularly, like Fig. 7, and they are sometimes much worse), is to lay out each of the primary leaders, *a a a a a a*, Fig. 6, dividing them equally and quite straight, and making them

fast by strong nails and shreds, always taking care that the nails are on the pulling side of the branch. Be careful not to let the nail come in contact with the wood, and never strike the tree with the hammer, for each of these things will cause gum. The next thing to do is to equally divide the second leaders, *b b b b b b;* then the laterals, *c c c c c c;* always observing the same rules respecting the direction of the branches, division, and position of the nails.

In my opinion the winter pruning of the Peach is best deferred until February or March, not because you can see better what to cut out and what to leave in, but because the trees are better able to resist the severe vicissitudes of such a fickle climate as ours; nor are the wounds then exposed to the drying and often protracted frosts, which will have the effect of producing crippled shoots in the following spring, besides, in some cases, causing dead limbs.

Each tree, as soon as it is pruned, should be nailed or trained in without delay; and as at this time of the season the fruit buds will be very prominent, great care is needed to avoid rubbing them off. If the walls are of brick—which are the best—no doubt wires to train them on may be good, because then the heat given off by the bricks will be enough, and will be more equalised than it is when the fruit is close to them, which often has the effect of scorching it. But if the walls are of stone, in certain seasons some difficulty may be felt as regards the ripening of the fruit on wires. The fruit will always be later on stone than on brick walls.

Summer Pruning and Training.

This consists in disbudding useless wood buds, *i.e.* all foreright buds, and some lateral ones not likely to be required. All buds that appear in front of the branches, so that they will not conveniently lay in either on one side or the other, must be rubbed off, and as soon as the young growth is long enough to nail in, it should be done, and all crippled leaves removed from the

trees. As I have already observed, now is the time to control the tree, according to its constitution. If the tree is weak, disbud more freely; if the tree is too luxuriant, lay in more wood.

Now is the time also to make rosy and handsome fruit or pale fruit. If the fruit is exposed to the sun from the first, *i.e.* from the time it is of the size of a small walnut, through the whole growing season until it is ripe, handsome and fine-flavoured Peaches will be the result; but if it is shaded by the foliage of the tree it will be as fine, but it will be of a pale colour. If shaded by the leaves till half grown or nearly full grown, and then exposed to the sun, the Peaches and Nectarines will get scorched on the side exposed, and be spoilt in appearance.

The fruit must be thinned, allowing three or four to remain to a square foot, according to the strength of the tree. It should be thinned as soon as it gets to the size of a filbert; and if the ground of the border on which the peaches are growing is of a stony and free nature, and the drainage of a very loose kind, I advise that one or two thorough good soakings with liquid manure be given them as soon as the fruit has attained to the size of a walnut, especially if the ground is poor and the trees are weak. It will be necessary to go over the trees twice at the least during the summer, to regulate the growth, and to nail in neatly all the good young wood.

In most young Peach and Nectarine trees, and others that are cut back, some very gross shoots will be made with wood buds a long distance from each other. These rank-growing shoots can be observed before they are half developed. As soon as they are from six to nine inches long, stop them by nipping off the top. The consequence will be a shoot of a weaker nature, produced from each bud below; and should these lateral shoots indicate too rank a growth, when they have made six inches of growth stop each of them again; by this means moderate fruit-bearing wood will result. Now, I think I have said (as briefly, and yet as much

in detail as is necessary) all that is really requisite on the management of the Peach on walls out of doors. They should, however, be frequently syringed during the development of the buds before the flower expands; but never syringe them while in full flower. It is a good plan in fruit-growing to preserve the pollen of the flower as dry as possible. To do this, hexagon fine cotton netting or coarse gauze let down over the trees at night is a good preventive against the night damps during its development; but these screens should be removed by nine o'clock in the morning at the least, on sunny days. The syringing may be carried on frequently after the fruit is set, and it should be done early in the morning during the months of *May* and *June*, before the sun rises upon the trees. I prefer the morning for syringing at this period, because, if done in the evening, the chilly cold nights give an additional check to the sap; and I have no doubt but that this is the cause of the crippled state mostly attendant upon the young growth of wall Peach-trees in the spring. The crippled state of the buds must certainly arise from the effects of the cold nights. This suggests a balancing of the day and night air by some means; and I know of nothing better adapted to this than the hexagon netting referred to, fixed upon poles let into the ground, and fastened

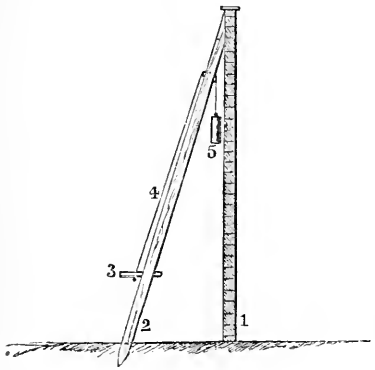

Fig. 10.

REFERENCES.—1, the wall; 2, the poles; 3, the pegs driven through the poles; 4, the cords on which the netting is fastened; 5, a weight of lead fixed on the cords by which the netting is easily pulled up by merely lifting the nets off the pegs; this weight should be a balance, and will retain the nets in position without further trouble.

at the top of the wall, placed six feet asunder, the netting being let down and pulled up by means of cords running through a hole made in the small pole at the top, and having pegs driven into each pole at the lower part, two feet from the ground. These are to rest the netting on when it is let down in the morning, and to keep it firm in the ground. These pegs will also answer for fastening the cords when the netting is drawn up. The sketch above will explain my meaning.

I contrived this when I was in charge of Peaches for a gentleman, and I found it answer well. A boy, or even a girl, can attend to this work night and morning during the few weeks the netting is required, which will be no longer than till the fruit is set, when the whole thing may be removed. The nets should be thoroughly dried and done up, being placed in a box or open bag, and put away in some dry room for another season; and with care these nets will last for many years. If even gauze is used it will prevent the pollen of the flower from becoming injured by the cold, damp night air.

Now I think I may close my remarks upon the pruning of Peaches on walls out of doors. I do not think I have omitted anything really useful except as regards destructive insects, diseases, &c., which I shall specially confine to a subsequent chapter. I do not think it worth while to multiply words, or to go into useless technicalities of detail, which may have a tendency to puzzle rather than to instruct.

CHAPTER II.

THE PRUNING, RENOVATION, AND TRAINING OF THE PLUM.

It is useless to attempt to grow good Plums in a cold, water-holding, clay subsoil. The soil should be gravelly, or one having a subsoil of a very porous texture, and dry, with an abundance of sand in it. The Plum will bear frequent removals, and this is a good way of treating a strong-growing young tree, whether it is a trained tree or not.

In some parts of the country the Plum, like the Apricot, will not kindly bear fruit. The soil is not always at fault in this matter, for the climate does not perhaps suit it. It is a rare thing to get Apricots in the county of Devon, and as seldom can a crop of some of our choice Plums be had there. The reason is chiefly attributable to the pollen of the flower getting glued by the dampness of the locality; the consequence is that the fructification is imperfect. The stigma does not get fertilised by the pollen from the anthers, simply because it is glued by the prevailing damp, and so cannot disperse. As a consequence the fruit cannot stone, hence a failure of the crop. In such cases there is no remedy for Plums planted as standards or dwarfs in the open ground, away from dry, warm walls, except one, and that is to grow them in pots upon Mr. Rivers's plan. When the climate suits them, and still they will not bear freely, but make wood, lift them every other season in the month of October. Merely dig round the tree and cut off the lacerated roots, and then plant

it again carefully, using no dung; a poor soil suits Plums far better than a rich one. The same thing applies to wall Plums when not disposed to bear; and for this reason I recommend "the cordon training" as a very useful type for lifting, as well as for the control obtained by it over the tree.

Fig. 11 is a *Magnum Bonum* or Orleans Plum, four years old, fan-trained on a south wall, and nipped back during the summer, *a a a a a a a a; b b b b*, the succeeding leaders to fill up and to remain permanent. If this class of tree is obstinate and grows too rampant, as they mostly do on strong soils, lift it,

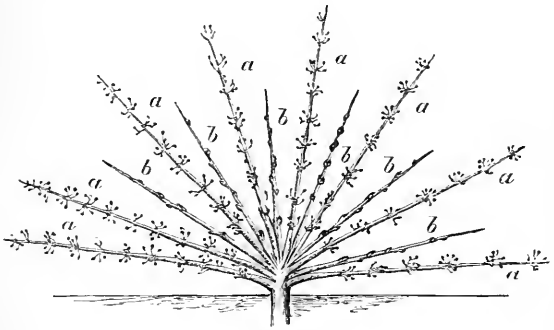

Fig. 11.

as for standards, every alternate season until it is productive. There is no better remedy to bring an over-free growing tree into a fruiting state.

In planting the Plum take care not to plant it deep, but as shallow as possible, so long as the roots are covered with six inches of soil. And do not cut it back if a trained tree, but lay the wood in at full length, unless it is intended for a treble cordon, like Fig. 12. But if the single cordon is required, like Fig. 13, I advise the planting of a strong one-year maiden, and to lay the single rod in at full length at once. If for a double or treble cordon, as Fig. 12, it will no doubt be

necessary to cut the plant back the first year to get a good equal growth like Fig. 12. These cordons may take

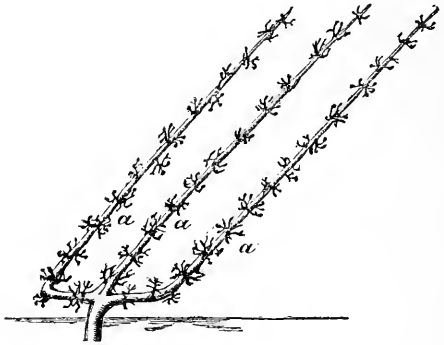

Fig. 12.

two or more years to form to the required length; nor is it the best plan to induce them to grow too fast with

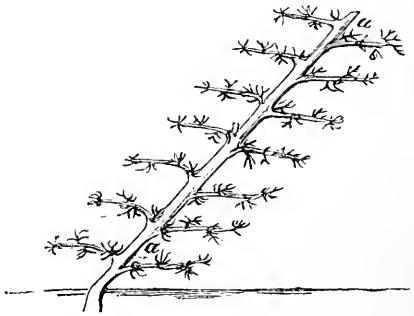

Fig. 13.

a view to get a full tree, for then the buds will be too far asunder.

In the case of Fig. 12 the fruit spurs are formed on the cordon leaders by summer nipping, as soon as two

leaflets are made, the tree being lifted every season in October to bring it to a fruit-bearing state, if not otherwise so inclined. As soon as an abundance of short fruit spurs are formed, as in *a a a*, let the tree remain till it shows signs of vigorous growth, which the Plum will do in strong soils after a few seasons; then give it another check by lifting.

In the case of Fig. 13 the fruit spurs are situated on the laterals, which may be equally good, as these laterals may be extended to a considerable length so long as the fruit spurs can be sustained in good order nearest the cordon leader, *a a*. Perhaps three feet on each side are as much as they should extend from the body of the tree, as the growth will always run to the ends, and so rob the spurs near the leader, but this must be overruled by lifting and replanting.

Plum-trees are a mere name in most gardens, and will remain so, as long as they are allowed to grow as they choose through the summer, and then merely having cut off in the winter what they have made in growth during the summer. The lifting, replanting, and the nipping in during the summer are the only means by which the Plum can be made to bear freely every year. The Plum is an early flowerer, especially in such counties as Devon and Cornwall, which are of an unusually mild climate, and abounding with moisture in the air, from their proximity to the sea-coast on three sides.

The Plum, Apricot, and some Pears, generally get too forward as regards the flower, and thereby get cut off by the late spring cold winds, so that not one season in five do we get anything like a crop of some kinds of early Pears (I mean some early-flowering Pears), nor a crop of Plums; and in the case of Greengages seldom or never. To remedy this, something more than the ordinary way of growing Plums, such as is adopted in those counties, must be resorted to; and for this nothing can be better than Mr. Rivers's "Hedge Orchard-house," which, for the convenience of my readers, I may venture to describe, with some little

modification. A span roof of any desired length, but not above 15 feet wide, may be built with a fixed roof, *i.e.* the glass placed in the rafters, which should be 20 inches asunder, and glazed with sheet glass 20 by 12. This gives frequent laps, which are essential for ventilation, as the laps will not be perfectly air-tight, nor is it required for this class of fruit-growing. The squares are laid in crossways, *i.e.* the narrow way of the squares counts up the rafter. The rafters need not be more than $3\frac{1}{2}$ by $1\frac{1}{2}$ inches, and should have a rap nailed on them to form the rebate instead of forming it in the rafter. The roof must be supported on larch fir posts, which must be let well into the ground—18 or 24 inches will be sufficient—and stand out of the ground enough to admit of a short man walking round the house inside when a sunken pathway has been dug out a foot or 18 inches deep. This pathway must not be dug out nearer than 18 inches from the posts inside, or they will give way, and an 18-inch pathway will be enough to walk in. It may be necessary to put a row of small drain-pipes 6 inches under the pathway to carry off any superfluous water that may drain in.

The sides of this Plum-tree orchard-house may be planted thickly with "common Yew," or *Siberian Arbor-vitæ*, and clipped twice during the growing season, but not too late the last time. A flap-board shutter must be made at the top ridge for ventilation, which may be made to open and shut with cords. This shutter will not require opening before the trees are in flower, nor shutting after the fruit is set, and the hedges will admit an abundance of air without any trouble—a thing of the utmost importance with the Plum.

The house should run east and west, and the trees planted and trained north and south—*i.e.* running across the house—4 feet apart, and trained as single "cordon oblique," then the sun will get at both sides of the trees. They may be trained on coarse wire netting strained on permanent iron stakes, and planted 18 inches asunder for single cordons, and should be con-

stantly nipped in. Thus an abundance of Greengage Plums may be had of the finest quality. The winter pruning consists in merely going over the trees with a keen-edged trimming knife, and neatly cutting the wood shoots close down to one bud, so as to keep a compact spur as nearly as possible.

CHAPTER III.

THE PRUNING, RENOVATION, AND TRAINING OF THE PEAR.

THE Pear has engaged the attention of all fruit-growers and writers on these subjects as much as the Peach, and perhaps even more, from first to last. Yet even now we can go into gardens and find Pear-trees of all classes sadly deficient as regards good culture. It may seem strange to some, but it is not difficult to

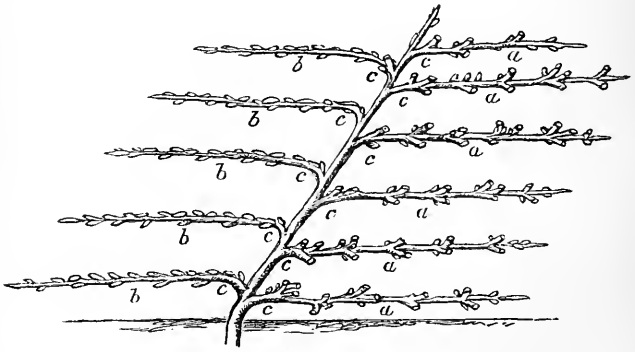

Fig. 14.

find gardens where the Pear is in exactly the same deteriorated state as it appears in the illustration, Fig. 15. This is too bad at this advanced stage of fruit culture.

When pyramidal or wall-trained Pears are to be

planted, choice should be made of those worked on the Quince stock, for then the growth is more congenial to early fruiting, and much less rampant. In the case of dwarf pyramids as well as trained trees, it will be necessary to lift them every two or three years to check too strong a growth, which is sure to arise in the

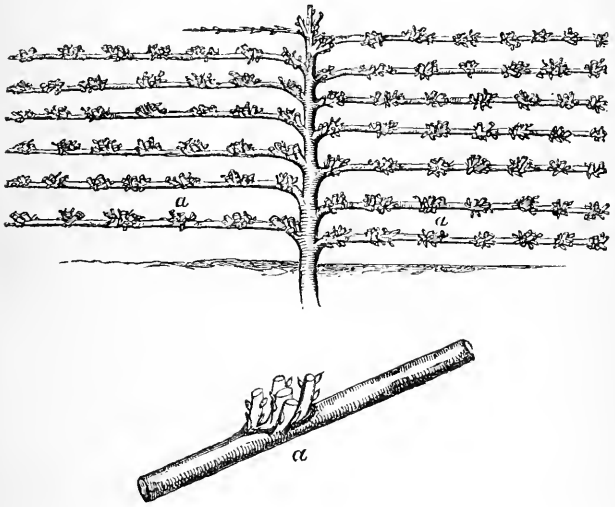

Fig. 15.

course of a few years with the Pear in good strong ground. Yet this is what is wanted to get fine fruit.

Fig. 14 is an example of a too free-growing comparatively young tree which has been annually cut back on the spur system, *a a a a a*. When a tree gets into this wood-making state little or no fruit will be had from it, except at the extremities of the leader on the two-year-old wood. In such a case the best plan is to cut the old spurs close off to the leader, as in *b b b b b*. Do this in the autumn after the tree has been

lifted or root-pruned, and the following season a weaker growth will be made, which, if frequently stopped during the summer, will produce fruit buds. If the tree is too large to lift, dig all the soil away from the roots to find the strong feeders, and sever them with a long sharp chisel, leaving the weaker roots untouched; or all the laterals, *a a* and *b b*, may be cut off at *c*, and let one year's growth be made before lifting or root-pruning, and then do it, which will produce an abundance of fruit spurs. Fig. 15 may be cut back, as seen in Fig. 16, and allowed to make a year's growth, which will compare with Fig. 18. The leaders, *a*, on the right hand of Fig. 17 show two years' growth, and well set with fruit buds, *b*, on the two years' wood all through. The leaders on the left hand, *c*, show the proportion of growth made the first season, and this is the proper time either to lift the plant, if not too large, or to root-prune it, *i.e.* as soon as the wood has done growing for the season, which is about the end of September. A worn-out tree may be reclaimed by this method if it is healthy, by which I mean a Pear-tree which has become past bearing, or that gives nothing but wood. These are still frequently to be found in good gardens as well as in ordinary ones, and many devices are suggested for their recovery. Some resort to ringing to bring them into bearing, but this is of little use. It is possible to give a sudden check to the growth of a tree by this ringing method, but it is sure ultimately to end in its death. But by

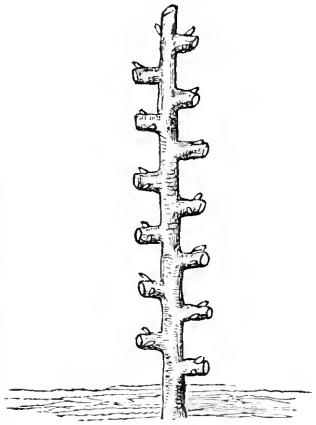

Fig. 16.

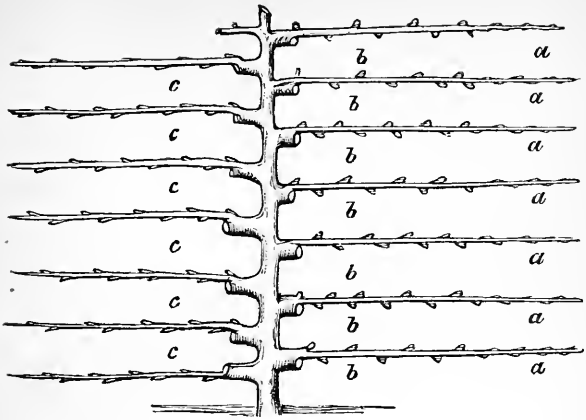

Fig. 17.

doing as I have directed above, a Pear-tree may be reclaimed, renovated, and made to bear well.

As soon as the cut-back tree, Fig. 18, has made one year's growth, as in Fig. 19, lift it, and then it will pass into the state of Fig. 20, when it should be lifted every alternate year, and the spurs nipped in all through the summer, when an abundance of fruit spurs

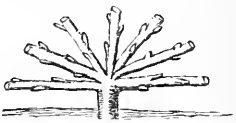

Fig. 18.

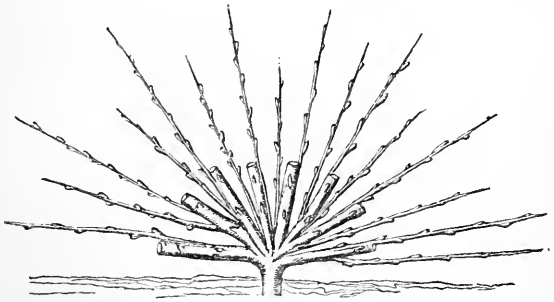

Fig. 19.

will be found, as in Fig. 21, which example is a fair

specimen of the tree reclaimed and brought to a good state of bearing. Now, to keep the reclaimed tree in this state there must be no omission of timely root-

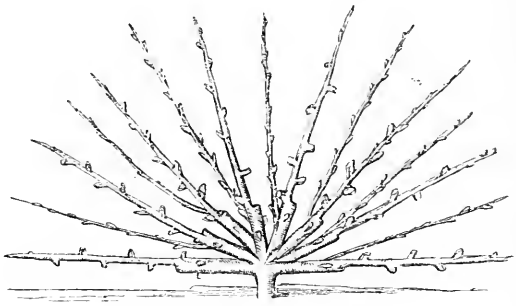

Fig. 20.

pruning or lifting, for it is a fact that Pear-trees are more liable to get out of a fruit-bearing state for want of root-pruning or lifting than any other class of tree

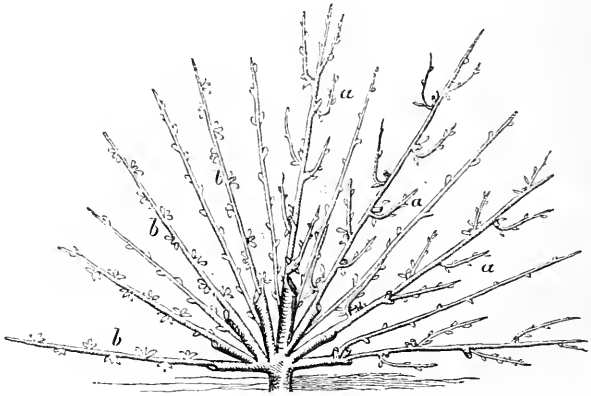

Fig. 21.

(I refer to trained Pears and pyramids left to take their chance, and not to standards), especially when grafted on the Pear stock. The reason is, that the Pear has a

natural tendency to descend deep into the ground, and to feed freely upon the moisture below; and, as a matter of course, there is always more of this below than nearer the surface of the ground, *i.e.* the deeper we go, the more moisture abounds. The Pear is fond of this, and will descend for it, and if the soil is naturally good below, and abounding in moisture, it will grow too rampant after a little while from the first planting; this is why the Pear gets unfruitful in the form of trained trees sooner than any other class of fruit tree. On the right hand of Fig. 21 may be seen the annual growth of a reclaimed Pear that has been well root-pruned or lifted, *a a a*, laterals from the spur, which, if nipped back three or four times during the summer, will not require cutting back as seen on the left hand of the tree, *b b*, and will, moreover, produce an abundance of fruit spurs, *c c c*, Fig. 22. But if not nipped back during the summer growth something like the Fig. 23 spur will be produced, *i.e.* if the tree has been root-pruned or lifted, but if not these spurs will become fruitless, like Fig. 15, letter *a*. In this case there are no fruit buds. These are easily distinguished the one from the other. The wood buds are more pointed than the fruit buds, and less prominent.

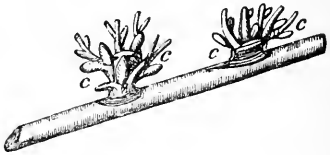

Fig. 22.

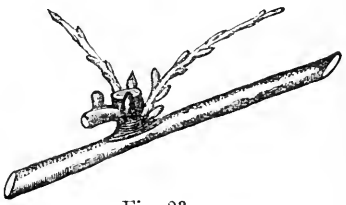
Fig. 23.

It is of no use to allow a Pear-tree, above all others, to grow all the summer, and then to prune all the young stuff off, and so continue to do from year to year. The fact is, the wood buds draw so heavily upon any promising fruit buds that they cannot form where they other-

wise would. To prove this theory correct use the very same tree differently, and follow up the plan of summer stopping, and then it will be seen that there will be more fruit buds than are wanted to produce a good crop of fruit. Some will say, But you cannot change the nature of each class of bud. I admit that a fruit bud will remain so for the time; nor can a wood bud be changed immediately from its own special character to one of another; but at the same time the wood spur can be made to produce fruit buds in the following season by the simple treatment referred to above, while a fruit bud, or rather a spur, will completely change from its character to a wood-bearing spur only in one or two seasons, merely by allowing a Pear to grow on through the season, and then to prune it off during the winter time only.

When a young Pear for a trained or pyramidal tree is planted lift the tree every alternate season for some years. This will induce the tendency to form a matty fibrous root, which will produce a corresponding state in the branches.

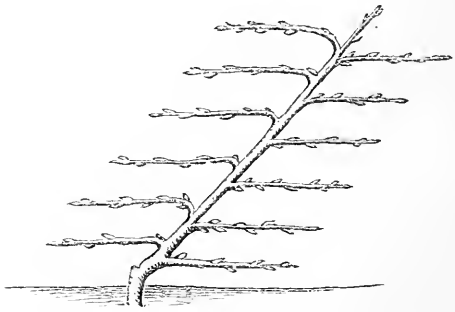

Fig. 24.

Fig. 24 is an example of a young cordon-trained Pear; Fig. 25 of the treble cordon Pear checked and summer-stopped, forming a well-favoured fruit-bearing tree. Of course cordon Pears may be multiplied in this way to almost any extent, and trained in a

variety of whimsical methods; but I advise that plan of training which is most convenient for lifting, especially

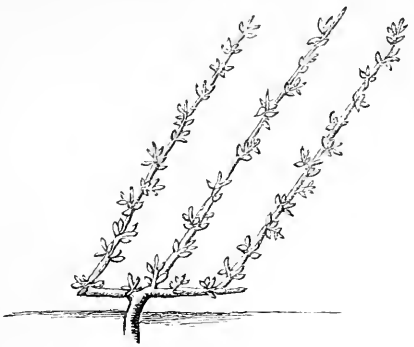

Fig. 25.

in Pear-growing. Considering this as a primary principle in Pear culture, none is, in my opinion, more eligible than the single, double, or treble cordon.

Fig. 26 is the maiden Pear for a pyramidal tree. When a plant of this sort is chosen select one with short joints, or spaces from bud to bud, for on this depends the formation of a compact or thin specimen. A plant that has grown very strong the first season from the graft will invariably possess fewer buds in a given length of wood than one of a moderate growth. The stronger and more vigorous a tree grows the first season for a standard the better, but not so for a cordon or pyramid; for this reason I observe the necessity of cultivating these two classes somewhat differently. Very rich and deep land may be selected for the stocks of the standard class, but land of a medium strength is best for cultivating the Pear for sale for the trained and pyramidal class. The first object should be the formation of a

Fig. 26.

close-jointed tree for the latter, and when the foundation is well laid better ground may be allowed for them.

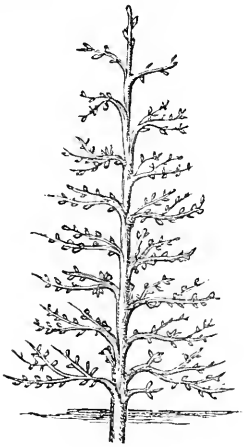

Fig. 27.

Fig. 27 is the maiden, Fig. 26, two years old, or rather two years planted, three years old from the graft. This is an example of a tree well formed, and that has been lifted and thumb-and-finger pruned through the summer.

Fig. 28 is an example of the same tree not thumb-and-finger pruned, showing a deficiency in fruit buds. Little can be looked for from Pear-trees of this class but wood if they are not lifted every alternate season, and well followed up by thumb-and-finger pruning. In case of neglect of this duty no alternative remains but to root-prune the plant in the autumn, and to prune it during February or March, or even April. I choose the spring annual pruning as preferable to the autumn for this class under such circumstances, because it will rather reduce the tendency to make wood than otherwise, which is a necessary thing when a Pear is winter pruned. The last season's growth should be cut off to within one wood bud, and

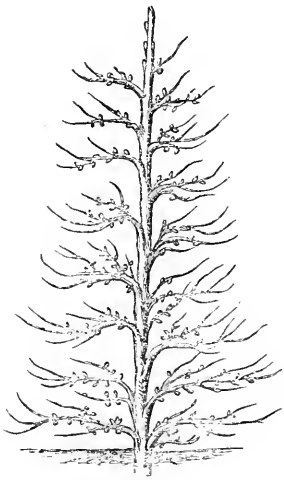

Fig 28.

the cut should be a short one, as shown in the illustration, Fig. 29—*a*, the wood bud; *b*, the fruit buds; *c*, the style of "short" cut—and as often as winter

Fig. 29.

pruning is done to either this class of tree or trained trees of any sort, whether Pear or Apple, it should be effected in the same manner, *i.e.* cut as neat and as close as possible to the last wood bud; in fact, all the young wood may be cut off as close to the fruit buds as possible irrespective of a wood bud at all, for Pears are sure to make wood enough at all times.

These pyramidal Pears can never be kept within the desired bounds, nor be made handsome and fruitful, unless they are judiciously managed; and I look upon them as miserable disorderly things when done badly; and certainly they are infinitely more inconvenient and cumbersome than standard trees, for you cannot do anything with the ground near them. Moreover, nothing can be grown under them; while, on the other hand, if they are well managed they make most handsome and prolific trees without taking up much room.

CHAPTER IV.

THE CHARACTER AND TRAINING OF THE APPLE.

The Pear is a very delicious fruit, but the Apple possesses some advantages over it. Whilst the Pear is prized for its richness, the Apple is held in high esteem for its accommodating properties to various purposes, times, and seasons. There are what may be called three classes of Apples, and each of these possesses some peculiar virtue of its own. First, there is the real sauce or jelly Apple, a most useful class; secondly, there is the dessert or eating Apple; and lastly, there is the cider Apple. This last is often substituted for the first, but there is a considerable difference in the quality of these two classes.

It will be found on trial that the real cider Apple possesses more juice than the real garden sauce Apple, but it contains considerably less sugar than the sauce Apple, or at least there is more insipid juice. I discovered the difference immediately when I first tasted a tart or pudding made with the Devonshire cider Apple. Our very best garden sauce Apples will not make cider, because they do not contain fluid or juice enough, and the juice is not much in advance of dirty water when first pressed out of the fruit either as regards appearance or flavour; and though our best garden sauce Apple possesses juice enough for tarts, jams, &c., it has not enough for cider-making.

Next comes the dessert or eating Apple, and this class is superior in flavour to either of the others. It may be cooked, but it will not answer for sauce or jams, nor

for cider. The *Ribstone Pippin* may be taken as a type *par excellence* of this class. It will not cook well, but it possesses all the qualities of a really good eating Apple. The *Keswick Codlin* and the *Hawthenden* may be taken as types of our sauce or cooking Apples. And what is called the *Bitter Sweet* may also be taken as a fair specimen of the cider class, which, however, no one would care to eat under any circumstances, such a tasteless variety is this Apple; yet it is prized for cider-making.

Having referred a little to the various classes of this highly favoured fruit, I may now turn to its cultivation.

The Apple differs considerably in disposition from that of the Pear, good deep land being required for the former. If the Apple is grown on poor dry land the fruit will ultimately be small, and the trees will become dwarfed and cankered, and will probably be covered with some kinds of lichen. This will depend greatly upon the locality—at any rate the fruit will be small. The Apple should be grown on rich sandy loam containing considerable moisture—a subsoil naturally retentive of moisture, but not to saturation or super-saturation, anyhow for a long time. The cider orchards of Devonshire are mostly planted in low grounds, and often where water abounds to saturation, but then there is a free drainage for excess of moisture, and here the Apple flourishes exceedingly as cider fruit.

The Apple differs somewhat again from the Pear in regard to another feature of its disposition. The latter must be root-pruned or lifted to induce fruitfulness, but this is not required for the Apple, at least as a rule. The Pear is naturally disposed to go too deep into the subsoil; the Apple has a tendency to run on or just below the surface. Of course it will ultimately make some deep ramifications into the soil below; but generally the small roots are not deep, nor is there the same tendency in that direction that there is in the Pear stock, so that as a rule Apples do not require root-pruning nor lifting to make them bear. I think the

Cornish Gilliflower may be almost taken as an exception. I find by experience that this Apple has a tendency to make wood very freely with long flexible shoots annually. I am of opinion that these might be checked by root-pruning, and then the plant would be more fruitful than it is at present; but it is a very tender variety, seldom perfecting the fruit out of Cornwall, or farther north than the south border of Devonshire. I have had this variety in my care for many years, but never get one tithe of a crop. It is a most delicious fruit.

In my opinion great mistakes are made in Apple culture. The choice of dwarf trees worked on the crab stock is an error, for unless these are annually cut back close, they soon get cumbersome and quite ugly, possessing a large head with a short stem. Again, standard Apples should possess clean straight stems not less than six feet high up to the first branches from the ground, and when it is intended to cultivate espaliers (which I think are certainly the most convenient for an economical and neat garden) the choice should be made accordingly, with no deviation therefrom, as is the case sometimes.

If pyramids are preferred, then choice of sort and plant should be determined upon beforehand, and no change made thereafter, as I find is sometimes the case. Here we have three classes of tree, each of which possesses a different character, and which should ever be maintained after in its purity of form. Each and all of these are commendable as such, in their respective places, but I have seen a whole garden of trees actually presenting a most unsightly appearance (and the garden itself too) entirely because the person who planted them did not predetermine what class of trees he would cultivate. It seems to me that no change of character can be well made after the plantation is complete, say after a few years.

The Pruning of the Apple, and the Renovation of the Apple-tree.

Fig. 30 is an example of an old dwarf standard left to grow unpruned. This is exactly what I mean as the effect of not predetermining what class of tree to cultivate before the plantation was made, and the neglect of annual pruning. Fig. 31 is an example of the same class of tree properly managed by annual pruning.

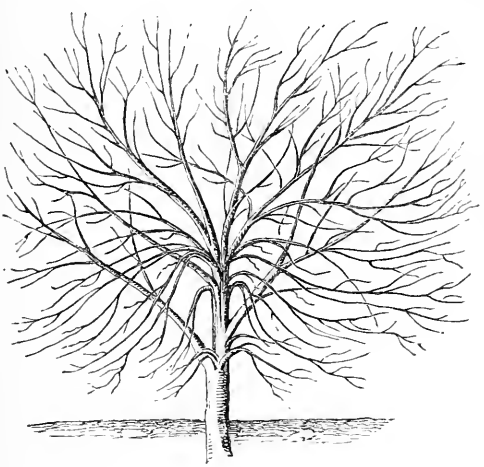

Fig. 30.

I once found a lot of young trees of this sort in a garden of which I had the care, and they were getting into the same state as Fig. 30. Well, I at once commenced cutting all the last year's growth off close to the old wood, as is shown in Fig. 31, and continued to do so every autumn or winter afterwards, and of course the trees increased in size, but very little—an important thing in all gardens, especially small ones. Yet as much fruit could be grown from such closely pruned trees as would be had from them if left un-

pruned, for my trees thus pruned produced fruit like ropes of onions, and it was considerably finer than it would have been if the trees had not been so closely attended to. The trees present a very neat and compact appearance, do not shade the ground, and room is left for more variety or a greater number of trees.

If summer pruning is well followed up, an abundance of fruit spurs in clusters will be formed. If winter pruning only is adopted, cut as close to the base of the last season's growth as possible, using a large keen-edged pruning knife, and make the cuts short across the wood. It may be necessary to root-prune a few sorts,

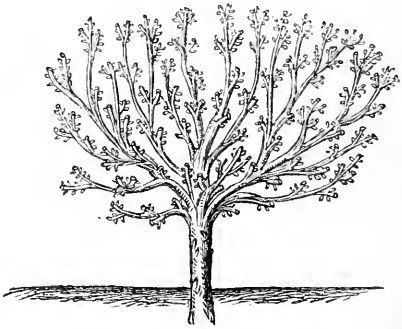

Fig. 31.

as I have already said, if they are grafted on the crab, but trees for this purpose should be chosen that are worked upon the Apple stock. In the first instance, when a young tree is planted, look well to the symmetrical formation of the plant. Set out the first principals of the head of the tree. If a maiden plant is used, decapitate the tree at the proper height for a half-standard or standard, and set out the branches as equidistant as may be possible. Then fill up between them with second principals, and ultimately the diverging laterals; and when the head is formed similar to Fig. 31, maintain its character as long as the tree will bear, which will be many years; but when the tree

ceases to bear (which ultimately it will do, in the course of thirty or forty, or perhaps fifty years, according to circumstances—sort, soil, locality, &c.) a process of

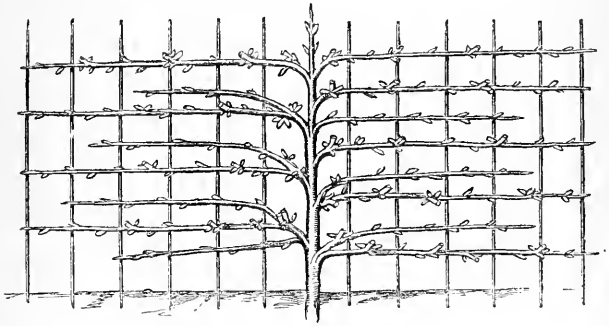

Fig. 32.

renovation may be recommenced. This consists in cutting back and grafting, or restoring the tree by a new set of branches. Now, if the tree is free from decay in the roots and stems, it may be restored by

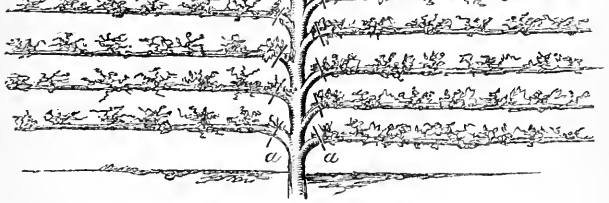

Fig. 33.

either process, but if the stem is decayed, or inclined to do so, it cannot be renovated, but must be rooted up, and a young one planted in its place.

Espaliers and pyramids may be renovated by cutting back, if all is sound about the root and stem, and the land is of a good friable loam or gravelly; but if it is of a stiff cold clay below, renovation by cutting back a very old worn-out tree is but a poor speculation. Grafting must be resorted to in such cases.

Fig. 32 is an example of a well-devised young espalier Apple.

Fig. 33 is an example of the espalier past fruit-bearing. In this case cut the laterals off at *a*, and graft them, or allow the tree to make fresh growth, judging whether it will do so or not from its healthy appearance or otherwise.

CHAPTER V.

THE CHARACTER AND CONSTITUTION OF THE CHERRY.

THERE are only a few localities which suit the Cherry. A dry soil and a dry air are the necessary requisites for success in the cultivation of it. In such counties as Devonshire and Cornwall a crop of this fruit is a rarity. In those warm humid climates the Cherry will make flower buds freely, but in consequence of the early opening of the flower and the humidity of the air, combined with frequent cold seasons and sudden changes of the weather, in nine times out of ten a complete failure ensues with the best kinds; and even should the weather prove moderately favourable the dampness of the air prevents the pollen getting distributed, and so no fertilisation can take place; hence the fruit drops off before it comes to maturity.

The Cherry, as a rule, is not fond of the knife, and, therefore, summer stopping for trained and bush trees is most commendable as a preventive against gumming, to which this tree is much liable. It must be carefully handled in pruning, planting, and in its subsequent cultivation. As a rule it will not require much thinning of the branches, although sometimes a standard will require a little thinning out, as shown in Fig. 34, but this is seldom the case. When done, it should be carefully cut back to a young piece of wood, leaving the young wood of a standard unstopped.

Fig. 35 shows a fair example of a pyramid pinched-in Cherry, which forms a remarkably pretty object; and a very convenient class of tree it is too, for these

compact pyramids may be planted on warm dry borders round the garden, and if nipped in close, and kept so for years, they will make but little advance in size. They will, however, bear an abundance of fruit, which can be easily kept from the birds by coarse gauze or fine netting, and so insure the fruit, which can never be done in the case of standards.

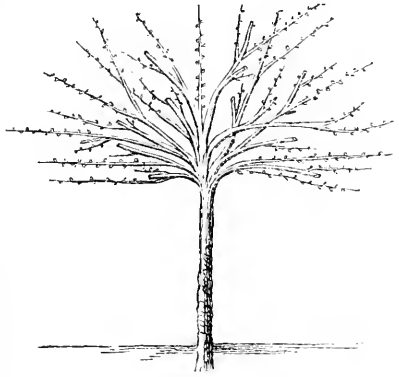

Fig. 34.

In cultivating a pyramid Cherry, it is necessary to induce the plant to form a good leader, and when it is four or five feet high nip the top out; but if the plant is not likely to break bud below, as may possibly be the case, the leaders must be stopped three or four times during its advance, to induce laterals from it to form the tree by degrees. These laterals must be frequently pinched back to induce sublaterals to fill up a symmetrical tree, and when the tree is formed, annual summer stopping may be practised to keep the plant in good order.

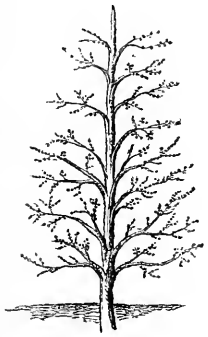

Fig. 35.

Fig. 36 is an example of a wall-trained Cherry pinched back, forming an abundance of fruit spurs, which will last for many years. Wall Cherries should be

judiciously planted, or a failure will surely ensue. It is quite a mistake to plant them on a cold west or north border. I am aware of the reason why this is done, viz. because the Cherry being an early flowerer, it is thought by doing so to keep them back in this respect; but the main object is lost sight of, viz. that little or no sun can get at the roots of the trees, and so the poor, delicately constituted tree is chilled to death sooner or later; and if it lives as a plant no fruit can be expected from it, for of all fruit trees the Cherry requires more sun at the root than any other.

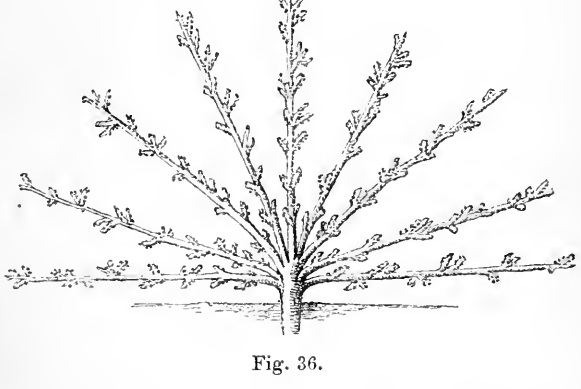

Fig. 36.

Properly speaking, there is no fruit tree (the Currant excepted) that will do well on a cold sunless wall. I am fully convinced of this from my own observation for a period of nearly forty years in both northern and southern counties; and I have noticed particularly that all are affected alike in such aspects. Lately I was in a garden which was of a cold flat situation, and consisted of a clay shillet soil. Here I observed that a fine Cherry-tree had perished, evidently from the coldness of the soil. Therefore, never plant Cherries on a cold northern or western wall.

Fig. 37 is an example of a standard Peach. The

Peach is grown as a standard (on the same plan as we grow Apples) in some countries. In Texas, for instance, Peach-trees are planted in orchards, where they are very productive; but the fruit is generally small on account of the trees not being pruned. If these were thinned similar to Fig. 37, the fruit would be much finer. The example before us may be useful to those who grow standard Peaches, or to those who do so in such places as Texas.

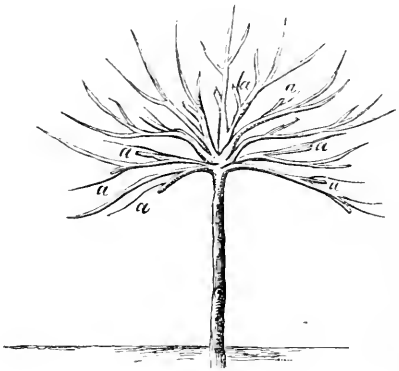

Fig. 37.

The pruning should be done soon after the fall of the leaf in those countries where the Peach will ripen on standards in the open ground, as we grow Apples in England, because there the climate must of necessity be very warm, without much winter, so that early pruning is necessary. Thin out the principals so as to open the head of the tree, and then shorten back to some young wood, *a a a a a*. Thus the annual pruning may be done to keep the tree to a moderate size, and to get finer fruit year by year.

CHAPTER VI.

THE GRAPE.

The Pruning and Renovation of the Grape Vine.

Now that glass is so cheap there seems but little reason for growing Grapes out of doors; yet as it is not at present within the reach of many who like a bunch of Grapes, and who grow them on the walls of the house, some practical advice as to the management of the Vine may be useful. Even now, at this advanced stage of fruit culture, we find Vines of no use beyond being a shade on walls during the summer from want of proper pruning.

Not long since I was called in to see what could be done with one which was in exactly the same state as Fig. 38, which depicts a worn-out state so far as fruiting goes. Now, whenever a Vine gets into such a condition, whether indoors or out, there is but one remedy for it, viz. to cut it clean back as shown at *a*, Fig. 38. No half doing things of this sort will suffice.

The Vine is fond of a dry, high temperature. In the West of England a good crop of outdoor Grapes can seldom be had, notwithstanding that the climate is much milder than in the northern counties. Yet the Grape ripens well and with more certainty there than in the milder counties of Devonshire, Cornwall, &c. The reason is that the atmosphere in the northern and midland counties is drier, and of course not so dense as it is where it is heavily charged with vapour, which impedes the action of the sun's rays. When I first came into Devonshire I was surprised to find that the

Grapes grown on walls were so slow in coming to maturity, and in most cases not even ripening at all, although the aspect was good. When I was practically attending Vines in the northern counties I never remember a crop of Grapes failing out of doors; but, on the contrary, I have seen nearly as good crops of the *Dutch Sweet-water* Grape out of doors as can be produced under glass in Devonshire.

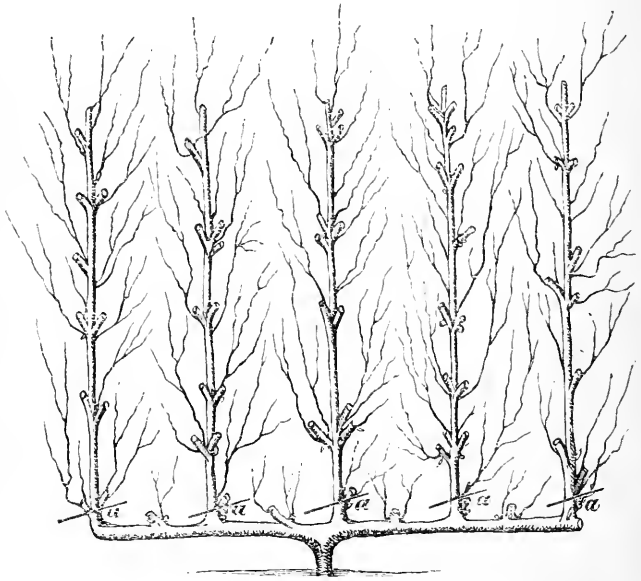

Fig. 38.

The Vine likes a dry subsoil, with a clear, dry atmosphere. To obtain good, solid, fruit-bearing wood, the main leaders should never be laid in nearer than two feet apart. The method of training is much a matter of taste, yet I am of opinion that the zigzag plan is most productive, on account of the check the sap receives by the sudden bends in the Vines, which partially prevents them from making too much wood

at the extremities (which they are especially disposed to do), and by this check a more equal distribution of growth is produced.

There are two established principles of pruning practised in Vine culture. Each has its advocates, but as a rule in each case circumstances must determine which method to adopt. The constitution of the Vine itself for one thing, and the object in view, must be the two principles for one's guidance. For instance, a

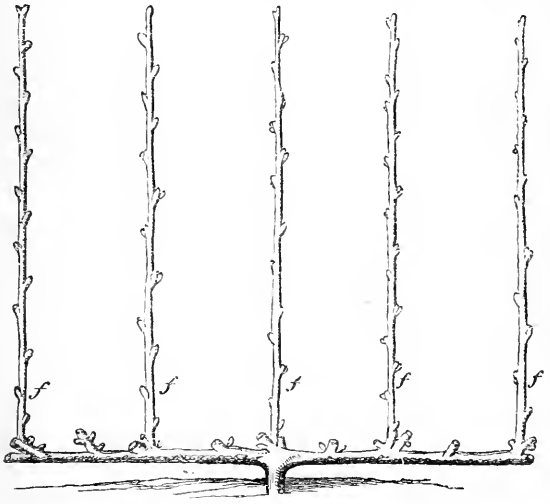

Fig. 39.

Vine that has not been thoroughly established for some years, and which has not a good supply of nutriment, cannot be safely pruned on the long-rod system here illustrated, Figs. 39 and 40. Young and weakly constituted Vines are soon ruined by this plan, while for thoroughly established and strong Vines it may be adopted to some benefit. The advantages are cleaner Vines, and finer fruit generally. This arises from a concentration of the virtues of the roots to the wood bearing fruit, chiefly as in *b*, Fig. 40, all up the Vine, which

will carry two bunches each if required, although one is enough to each lateral. The rod *c* was made the previous season like rod *d*, the whole length of say fifteen or sixteen feet, and if the rod is well ripened and strong, a crop of two bunches per lateral is certain throughout the length of the rod.

But if the wood is weak, and grown in a house not well exposed to the light and sun's influence, the probability is that many of the eyes, *e*, will be abortive, and of course fruitless. Nor can the long-rod system,

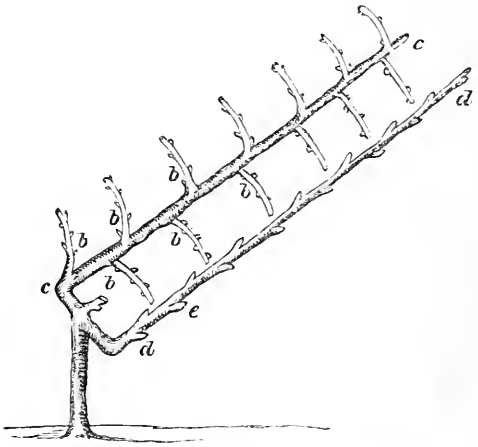

Fig. 40.

Fig. 40, be often safely adopted in outdoor Grape culture, as is seen in Fig. 39. This illustration is merely to show what the result of cutting down a worn-out Vine will be. These rods, *fffff*, may be pruned on the spur system, *g*, Fig. 41, and continued as long as a crop of good fruit can be had from the Vines, but as soon as signs of weakness appear, as in Fig. 38, cut the rods down as before described. Fig. 41 is an example of one pruned on the spur system, and may be practised upon any Vine, but is the only plan practicable on weak Vines, and such as can only

be supplied with a moderate quantity of nutriment. These main rods, on which the spurs are, can only be allowed to reach the full length within one, two, or more seasons, cutting them back proportionably each successive season.

In pruning the Vine, under all circumstances use a sharp thin knife, and cut nearly close to the bud or eye, choosing a plump and a fully developed one for the base of the next year's supply, one bud or eye being enough. It should be pruned as soon after the leaves have dropped off as possible. All spray, *i.e.* weak stuff, that is sometimes found on badly managed Vines,

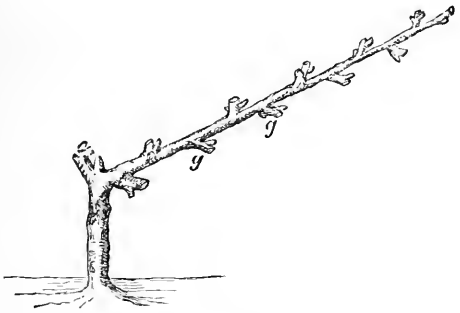

Fig. 41.

must be cut clean out, leaving only strong eyes for the following year's supply of wood; and if the spurs are too thick on the leader rod thin them out, cutting them clean off. It is bad policy in Vine culture to allow too many rods—*i.e.* never allow them to be so thick as to cause the young growth to overlap one another much. It is the sun that is wanted for the Vine.

In pruning the Grape in the vinery, all the leaders and the stems should be thoroughly cleaned at the same time, *i.e.* the outside bark that is in a measure loose should be peeled off to the smooth light brown bark; this will clear away embryo insects that may be

deposited there, and will also expose the wood to the warm influences of the house. Every season the Vines should be painted over with soft-soap and sulphur-vivium of equal parts and well mixed, being put on with a brush.

Summer Pruning the Vine.

Some good cultivators of the Grape adopt the plan of stopping the laterals at the joint at which the bunch of Grapes is situated, and some say stop it one joint above the bunch. The latter is no doubt the most reasonable. This should be done by snapping the young wood off at the joint, and not by cutting it with a knife, as is even now practised by some ignorant persons. The stage of growth at which this should be done is no doubt a matter of some importance. And in my opinion it should not be done till after the fruit is swelling off, as a check must arise from the sudden reduction of the young growth, which may deter the progressive development of the embryo fruit. After the fruit has reached a size to command a rapid and forcible draw upon the channels of the currency of the sap to itself, equal to the growth of the lateral on which the fruit exists, no check to the fruit will arise from the sudden stopping of the lateral. The bunch of fruit will get the immediate benefit, as the sap will be turned to it by such stopping, and the fruit being then in a stage capable of receiving the full complement of sap, no loss will arise; but it will be found that if the lateral on which the bunch is situated is stopped too soon there will be a tendency to make wood at every point accessible to the sap, and the fruit will not swell so fast as it would have done if left till it was in a more advanced state before the stopping was done.

All subsequent laterals must be duly stopped, and if the Vine is very luxuriant two bunches may be allowed on each with advantage to the Vine; for it generally happens with such Vines that when there is not an equal consumption of the supply of sap by the fruit of one bunch, the bursting of the eye will take place,

and a troublesome emission of the sublaterals, consequent upon such supply being more than can be consumed by the one bunch. I think, upon the whole, that this indication may be a good guide in judging of the strength of a Vine, and a fair criterion as to whether it will carry one or two bunches of fruit to a lateral. A Vine may not be able to do this every season, but it may do so as long as the indications are good in reference to its strength.

The Colouring of Grapes.

Various are the reasons assigned for Grapes not colouring, and although this has little or nothing to do with the pruning of the Vine, yet I feel bound to refer to it here. Some theorists say that the colouring of Grapes depends upon the light, and some that it depends upon heat, while others assert that it is affected by the strength of the roots, *i.e.* the healthy state of the root; but I am convinced that it depends upon none of these individually.

The colouring of the Grape is caused solely by the oxygen of the atmosphere. It has nothing to do either with the kind of Grape or the state of the Vine. Those who cannot see this should go to Texas, where all sorts of Grapes grow wild on trees in the forests, in which country they are enveloped in shade and are crowded with other shrubs, which eat out a great deal of the virtue of the ground. In consequence of this the Grapes are small to what they would be if they were cultivated. Notwithstanding this drawback to the production of fine Grapes, the fruit ripens as black as jet throughout the whole bunches, although it is as sour as vinegar. The air of Texas is hot and dry. The black cluster Grape grown on walls out of doors will ripen as black as sloes in this country, notwithstanding that the ground is poor and the fruit small. So also will the Frontigniacs colour well on a good wall out of doors, while often they will not do so in a house. All this brings us to one conclusion, viz. that heat and air are the only conditions

required for colouring Grapes, and not light or high cultivation. Here we solve the difficulty, and ascertain the cause why early house Grapes will not colour, viz. a high temperature and want of sufficient air.

It is not the high temperature that will do it without the same proportion of air. The oxygen acts upon the juices of the fruit, and changes the colour in proportion to the extent in which that gas is present. This is the whole theory of the subject.

There are features relating to the cultivation of the Grape which do not actually come under my present notice in a work on pruning only; but I may mention a plan I used to adopt for the admission of air into a house I had for Grapes. As the sashes of early graperies can seldom be opened, some means for the admission of air should be resorted to, and I have found that openings made in the front wall of the house close to the ground, about nine inches square, fitted with sliding shutters, are a most excellent method, supposing the house to be a lean-to, and the pipes close to the floor along the front. There can be no doubt but that is the proper place for them. Then these shutters may be opened every morning at nine o'clock, let the weather be what it may, except during a sharp cutting wind or frost. In fact they may be left open night and day from the beginning of May until the end of the summer, without any danger whatever; for if a good brisk heat is kept up in the pipes, the air coming in contact immediately with the hot pipes gets sufficiently heated to prevent any chill to the air of the house. Moreover, the heat gives vitality and speed to the air admitted, which is immediately distributed among the leaves and fruit, even causing a slightly visible motion to the leaves of the Vines, which is an evident token of its circulation. The openings may be three feet, a few inches more or less, apart.

CHAPTER VII.

THE PRUNING AND RENOVATION OF THE FIG.

In the southern and western counties of England the treatment of the Fig differs considerably from that of the northern part of the country. In the latter it must be grown under glass to insure a crop of early Figs, or if grown on open walls it has to be matted up through the winter to preserve the young green fruit if possible. However, the chances are often but poor, should the winter prove a protracted or frosty one. But in the West of England, where the Fuchsia and the Myrtle attain to the size of a low tree, and Geraniums survive the winter for several successive seasons, in the mild counties of Devon and Cornwall, the Fig bears well and ripens to perfection on open walls as well as on standard trees, without any protection through the winter, the young Figs remaining on the tree and ripening very early, and the second crop ripening also.

The pruning of the Fig may be described as similar to that of the Grape Vine. The fruit comes on the young wood in the same manner, only there is this difference, that the late crop will remain on the ripened wood through the winter if the climate will admit of it, and then ripen very early, while the Vine makes the wood, and ripens the fruit at one and the same time, there being no second crop, or tendency to bear fruit on the late young wood, as there is in the Fig. This makes some difference in the mode of pruning.

Fig. 42 shows the manner of close pruning a

trained Fig for a late summer crop only, as is shown in Fig. 43, *a*, which crop may be considerably increased in size and facilitated in ripening by stopping the laterals *b b b*, as shown in *c c c*. The advantage derived from this stopping one eye above the fruit is apparent in the difference between Fig. 43, leader *a*, and leader *d*, the laterals and the fruit thereon being of the same age. This stopping must be done as soon as the last fruit is fairly shown, one eye above it. The fruit then begins at once to swell off.

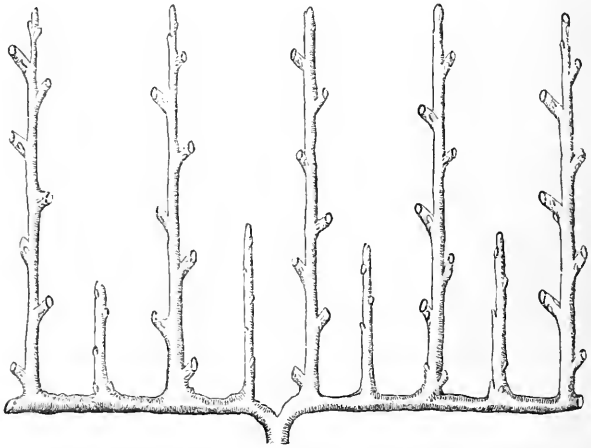

Fig. 42.

Some do not prune the Fig more than the summer stopping, but in such cases the trees get so bulky, and beyond what is neat and good-looking for a good garden, that some winter pruning is undoubtedly necessary. To such I would say, shorten in and thin out during the winter or spring, the latter being preferable. No great loss of fruit will be incurred if a reserve is made of such branches as contain an abundance of short fruit laterals, but cutting back and

thinning out must be done at times, if not annually.

In the cold northern counties, where the Fig must be matted up to preserve the late fruit through the winter, rather a different plan must be adopted. To insure a crop of good early fruit they must be grown under glass or be planted on a warm south wall, pruned like Fig. 42, and the late crop well matted up with *Frigi*

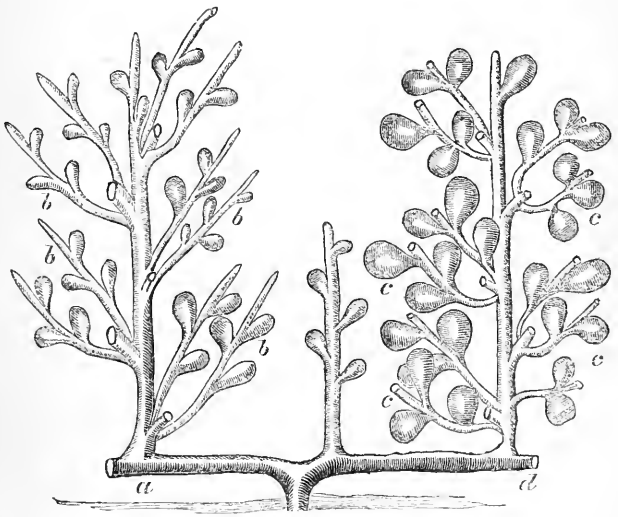

Fig. 43.

Domo and reed mats outside. Of course I do not mean that the young Figs must be pruned off, but, on the contrary, those made late must be matted up to preserve them, as is seen in Fig. 43, *a*.

Figs may be grown with ease by any one under rough-built glass where a western climate can be imitated, and no more pruning required than summer stopping, as already referred to. The fruit may appear an

exaggerated crop as I have shown it in the illustration, but it is not so. Figs will bear equal to what I here represent them if treated accordingly, although they never show as they appear here, because the leaves hide the fruit from view. The leaves are not put in here, as they are not necessary, and to make the thing plainer.

CHAPTER VIII.

THE PRUNING AND TRAINING OF THE GOOSEBERRY, CURRANT, RASPBERRY, ETC.

On the proper pruning of the Gooseberry depends the ultimate as well as the present well-being of the tree, besides other results in the shape of fine fruit. Some persons never prune it at all, while others do it without judgment, and both courses end badly. It certainly requires some judgment to know how to prune a Gooseberry-tree.

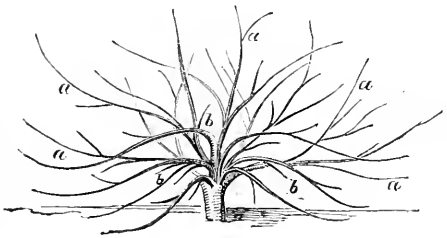

Fig. 44.

Fig. 44 is an example of a standard Gooseberry properly pruned, *a a a a a*—the last season's growth left at full length, which should be the case unless extending far beyond its limits, when it may be slightly shortened. The thinning out consists in first cutting away any old limbs filling up too much space and in process of decay; and secondly, thinning out the young wood, *b b b*, so as to open the tree sufficiently to

admit the light and air, cutting it in to within a few buds.

All suckers must be totally eradicated from the base, but never cut back to the surface of the ground with the knife, which is frequently done, and is sure to end in the ruin of the tree. The cause of these root suckers is badly made cuttings in the first instance, and secondly, imprudently digging too near the stem, maiming the roots and turning them up to the surface, when they emit shoots; and when once the Gooseberry commences to do this it is difficult to prevent it continuing to do so afterwards.

The ground between Gooseberries should never be dug with the spade, but with a three-pronged potato fork, and then not too deep; eight or nine inches are quite enough. In making Gooseberry cuttings, be careful to denude the cutting of all the buds except one at its base and two or three at the top.

Gooseberry pruning should not be done much before the month of March; by that time it can be seen what is good fruit-bearing wood, and what is not. It often happens that, if pruned before March, the only fruit-bearing wood left on purpose for a crop has been completely divested of all the buds by the bullfinches, and sometimes by the sparrows, so that probably there will be no crop at all. But if the pruning is left till the buds get pretty forward the birds will not touch them, and a crop may be insured. If the finches have picked out the buds, which they always do along the long outward young wood, then it is best to cut it back to a sound bud, or a budless limb will result.

Espalier Gooseberries.

Espalier Gooseberries are very convenient things for small gardens, and form pretty low breaks around some quarters of the garden. These low espaliers may be pruned, as shown in Fig. 45, into long spurs, leaving three buds at the base of the last season's growth. These will bear fruit in abundance. Stakes of iron rod 2 feet

or 2½ feet high will do well for these espaliers. Occasionally one of the old limbs will decay at the base,

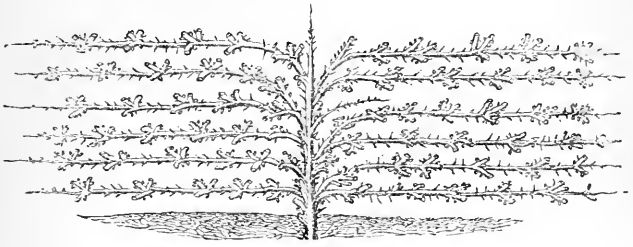

Fig. 45.

when a young leader must supply its place. This is the whole theory of pruning and training the Gooseberry, and it is very simple.

The Currant.

The pruning of the Red Currant and the Black Currant are two quite different things. It will be observed that the Red Currant bears its fruit upon the old wood or spurs seated on the old wood, while the fruit of the Black Currant is produced upon the young wood, *i.e.*

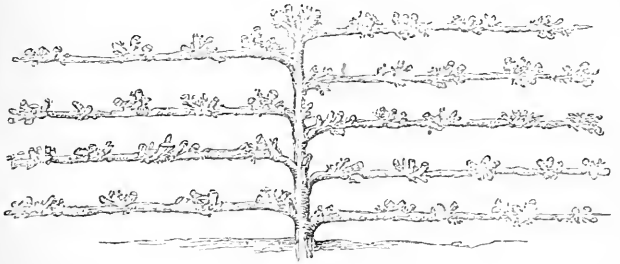

Fig. 46.

the fruit comes upon the wood made the preceding year. This circumstance at once suggests how to proceed in the pruning of each class. The Red Currant must first be formed into shape as a standard, as an espalier, or

as a trained tree. The leaders must form the tree as it should be for some years to come. Then it may be kept to that, as a rule. See Figs. 46 and 47.

The pruning in each of these cases is the same, and a similar method must be adopted for wall-trained Currants of the Red and White kinds. Cutting close back every season to a bud will cause large old cluster spurs to be formed in due time, as is shown in Figs. 46 and 47. If at any time an extension of the tree is necessary, it is only needful to leave as much young wood as is required to fill up the space.

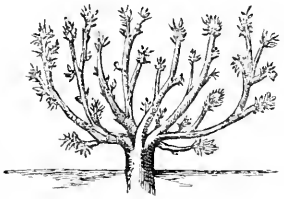

Fig. 47.

The winter pruning of the Currant may be done at any time from November until February, or even March, but not later. The ground where Currants are grown should be manured in the autumn, and forked over with a three-pronged flat potato fork ; and in the spring, as soon as the buds begin to swell, sow a heavy dressing of soot over all the trees and land. This will prevent the progress of the caterpillar, and at the same time manure the ground.

The Black Currant.

Fig. 48 is an example of a well-pruned Black Currant.

In order to maintain a healthy, robust, and vigorous Black Currant plant, and to insure fine fruit, it is necessary to heavy dress annually the ground in which it grows. It is a strong grower, and it therefore requires good land and a powerful stimulus to support its nature and to produce fine fruit. It will be seen by the illustration, as well as by its natural character, that the pruning of the Black Currant is quite a different process from that of the Red Currant, as I have before observed.

The fruit comes on the young growth, *i.e.* the previous year's growth bears the fruit the following season. This at once points out the method of pruning to be adopted, and also what is required to get good fruit-bearing wood for each successive season, viz. a strong growth and a constant annual thinning out of the crowded branches, so as to keep the tree well open in the centre. Never spur in a Black Currant as in the case of the Red Currant. Cutting back some of the old wood is necessary, as is shown in Fig. 48, letter *a*.

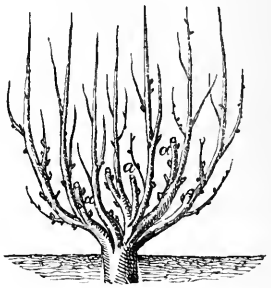

Fig. 48.

When Black Currants are trained on walls, the same rules should be observed for pruning as are adopted for the Grape Vine. All the finest fruit comes upon the previous season's growth.

The Filbert.

The cultivation of the Filbert for home use or for commercial purposes is a pleasant and profitable business, especially where the soil and climate are suitable. A mild climate is requisite as a rule to insure a good crop of Filberts every season.

It is an early flowerer, and should the weather prove wet and cold during the month of February (when it is in flower), no Filberts can be expected, except in the warm counties. This tree, like the common Hazel Nut, produces two kinds of flowers. The catkins, or what are vulgarly called "lambs' tails," are the male flowers, or those which do not bear the fruit, but only pollen. These, it will be observed, are suspended in a most graceful form from the young wood in great abundance in the early spring; and at the same time, if you look closely lower down on the same wood, and also on the

older wood, you will see numerous minute pink-coloured brushlike flowers issuing from the hard wood, as it were. These are the fruit-bearing flowers, which should be in a fit state to be fertilised with the pollen falling from the male flowers above them at one and the same time; but if the weather is wet and very cold no Nuts can be expected, because the pollen cannot disperse itself sufficiently to fertilise the female flowers. This unfortunately often proves to be the case in cold counties, but in the western parts of England it seldom or never suffers in this way, and consequently an abundance of Nuts is certain.

The soil should be a somewhat gravelly one, with a good free drainage.

When Filberts are grown in private gardens, where neatness is an absolute necessity, the pruning must be done annually, but in doing so the young growth must not be cut down too close, for at the base of the last season's growth, or within a few inches of it, the male flowers and some female flowers will come. The former will spring from all the young wood, except just at the top; but if Filberts are not pruned they will get completely out of order.

The time of pruning should be regulated by the circumstances of the case. In a fickle climate like ours, it will be a very hazardous thing to prune before the plants have flowered; but as soon as that is over it may be proceeded with. As the male flowers are produced upon the last season's growth, none of that should be cut off before the flowers have dispersed the pollen. Then it may be cut off to within a few inches of the base, the tree first having been symmetrically formed similar to Fig. 49, to which style the plants may be kept for many years.

A Filbert plantation should be screened from the cold cutting winds from the east and north-east by one of Spruce Firs, or by some evergreens.

The Raspberry.

The soil required for the Raspberry should be of a good light texture, having some sand in it, and mode-

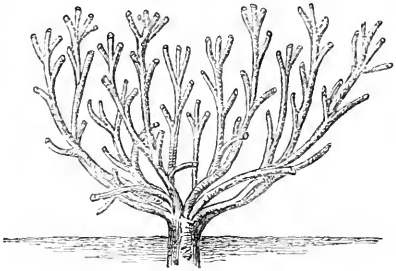

Fig. 49.

rately deep. Annual dressings with good manure are necessary to induce vigorous growth. These dressings should be put on and forked in all over the surface, never digging between this tree with a spade, nor with the fork too close to the main plant, except merely to stir the soil a few inches deep round the stool. All stray suckers which run from the main plant should be removed annually, and the manuring and pruning should be done in the autumn, say in November.

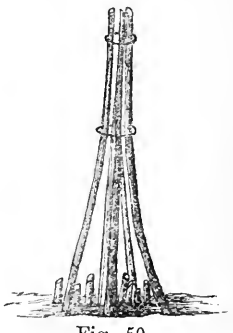

Fig. 50.

The pruning is simple, and can be done by any one. If the plants are strong, *i.e.* if each stool throws up more than four good canes five or six feet high, cut all down close to the ground, as shown in the illustration, Fig. 50. If the canes are weak leave three to bear fruit, and if very weak one cane will be enough. Cut off the tops of all the strong ones down to, say, five feet, which should be tied to a stake of

the same height, or they may be trained similar to Fig. 51.

It must be borne in mind that all those canes that

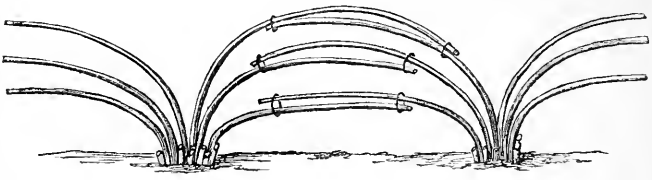

Fig. 51.

have borne fruit never do so a second time, but die in the autumn.

It is not a good method to plant the Raspberry above one or two years old at the most.

The Quince.

The pruning of the Quince may be assimilated to that of the Pear. Quinces are generally planted in some out-of-the-way corner. It is certainly necessary to put them where moisture abounds, for they seem to be partial to water, but at the same time an open spot is also necessary. In pruning the Quince observe to thin out the main branches, and then cut back what is out of order and fruitless.

The Mulberry.

Generally the Mulberry takes its own course, and seldom or never gets pruned. This may not be needful in order to produce fruit, but cutting-in is absolutely necessary to prevent future disasters; for as the Mulberry gets old it becomes heavier at the extremities, in which case the main limb cannot sustain the weight of so much foliage, and so it is sure to be damaged by the high winds, which often blow off half of it, thereby causing the loss of a large and handsome tree.

Now, if the Mulberry is shortened in judiciously before it gets old and loaded with thick branches at the extremities, which it is sure to do, the main limbs will get more robust, and possess an additional strength to resist the powerful winds of the future, and so obviate what often happens to these trees.

PART II.

THE PRUNING AND RENOVATION OF PARK AND AVENUE TREES.

As a rule trees for avenue planting, especially for public road work, are not well selected, and they are, moreover, generally neglected until it is too late to make handsome trees of them, suitable for a well-devised public promenade, especially for a high-class community.

I observe that trees not at all suitable for this purpose are frequently planted, which, after a few years, have to be cut down. The common Horse Chestnut, for instance, is mostly selected and planted at intervals along with, perhaps, the *Lime*, *Turkey Oak*, *Elm*, &c. Now the Chestnut will outgrow most other forest trees; the consequence is an irregular avenue; and then after awhile a high wind blows off a large limb and makes the whole thing most unsightly. Then the Chestnut has to be cut down, when a vacancy occurs at once, thus spoiling every good feature in the avenue.

Now, when this is the case, or rather when the Chestnut or any faster-growing tree than the rest is planted for an avenue, let it be annually cut back so as to make it meet the object in view. But I advise that no such class as the Chestnut be planted with the Lime, Elm, or Green Oak for street purposes, nor, indeed, as a selection for any avenue at all. Variety is pleasing to be sure; then select the Lime, the Evergreen Oak, the Elm, and the Sycamore. These may be made to coincide with each other as regards growth. The Ever-

green Oak is the most suitable for a street avenue, as it requires but little pruning, and that is easily done with a long-handled *averruncator*. The LIME can be planted with it or alone for such promenades. This tree is of slender growth, and can be easily pruned by the same means, and if at any time it gets too large it may be cut back to any extent.

The ELM is a very good tree for street avenue work, and can be pruned to any extent. The SYCAMORE is a handsome tree for this purpose, especially when in flower and bearing the seed. It may be pruned to any extent, and the branches shortened in when they get beyond the desired limits. The Turkey Oak is a handsome tree, but unless it is pruned annually it will soon make but a poor appearance in this situation.

The BIRCH is also a very graceful tree, and the *Poplar* (the upright Poplar) is a good avenue tree, causing but little trouble and living to a great age. It should be planted rather closer than most other forest trees. No pruning is required for it.

The PLANE-TREE is a fine-foliaged deciduous kind, suitable for the street, but it is better adapted for road avenues, where it may be allowed a rather freer scope to develop itself than ordinary streets will admit of. It requires the same kind of pruning as the Lime, and may be made a beautiful summer ornament if not pruned in too close.

When any of these trees, except the last named, are planted for street avenues, pruning should be commenced as soon as they begin to grow freely, cutting-in the ends of the branches so as to induce a compact and symmetrical growth; and as soon as they have attained to their utmost limits they should be annually pruned in with the *averruncator*. It may be done in the autumn for deciduous kinds, but in the spring for the evergreen kinds.

The RENOVATION of avenue trees consists in cutting back severely such as will bear it, and the complete decapitation of some. I am sometimes sorry to see old-established healthy trees completely extirpated when

they belong to an avenue, because it causes so many years' vacancy and loss of beauty. Nor is there really any need for it, for the trees enumerated above are well able to bear a severe cutting back; and if due attention is paid to the early pruning of them and the formation of a compact growth no such severe process will be required. But if at any time it is necessary, no one need be afraid to cut the heads close down, as is seen in Fig. 52. Fig. 53 shows the tree recovered by one season's growth, supposing it to be an evergreen *Oak*, *Lime*, *Elm*, *Sycamore*, or a *Chestnut*. Fig. 53 is a fair illustration of the thing.

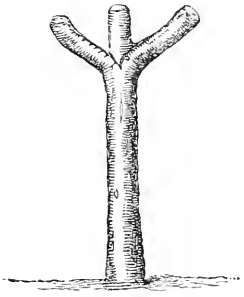

Fig. 52.

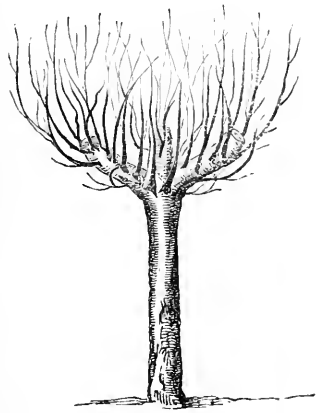

Fig. 53.

PARK TREES will seldom require any pruning except to shorten in those branches which have advanced too freely, and have consequently distorted the tree, and which will in all probability get blown off by a high wind, as is frequently the case with the Horse Chestnut. The evergreen Oak which I refer to is not the *Ilex* Oak, but the "Lucombe Oaks," of which *Crispa* and *Dentata* are the most beautiful varieties. *Suber* is also a very beautiful evergreen Oak. The Cork-tree will do well in Devonshire, and is admirably adapted for superior park and open street

or road avenue work. All these bear pruning well, and moreover carry a handsome foliage.

A street avenue may be formed of the common Yew, *Ilex* Oak, and the *Lignum Vitæ*, or Lime, although the last named will be difficult to keep as neat as the first three. Still by clipping two or three times during the summer the Lime may be made to present a much neater appearance than is generally supposed, and it will bear any amount of clipping or cutting.

Now, if constant attention is paid to such summer shades, nothing will better repay the inhabitants of hot towns like Torquay in summer, than avenues or rows of trees planted next to the shops. They are almost necessary adjuncts to places of such beauty. Shade is the thing wanted during the summer months in places which have so many attractions.

PART III.

THE PRUNING AND RENOVATION OF FLOWERING AND OTHER SHRUBS.

CHAPTER I.

THE ROSE.

The various classes of the Rose differ in constitution and disposition to a considerable extent, and unless these characteristics are well understood much disappointment will arise from improper pruning. As an example of my meaning I will name one or two—Coupe d'Hébé, Brennus, the Beauty of Billiard, and the double "Persian Yellow." The first is one of the most distinct and beautiful, as well as one of the most perfect Roses extant—a Rose that no garden should be without. All three of the above-named before the Persian Yellow are of the class that will not bear the knife like the Chinas and the Perpetuals.

Fig. 54 is an illustration of the way to prune strong-growing Roses like *Brennus*, *Coupe d'Hébé*, &c., as standards: *a*, the last season's growth cut back to within five or six buds; *b b b*, the same growth of the young wood cut back to within one or two buds to give a supply of wood for flowers the following season.

Fig. 55 is an illustration of the proper method of pruning the Austrian Brier, or Persian Yellow Rose: *a a*, the year's growth, merely cutting the points of the shoots off; *b b b*, the same growth cut back to within two or three buds for a supply of wood for pro-

ducing flowers the following year. Each of these cases may be taken as an example of the mode of pruning the numerous strong-growing Roses on the Dog Rose as standards or dwarfs, and the Briers also.

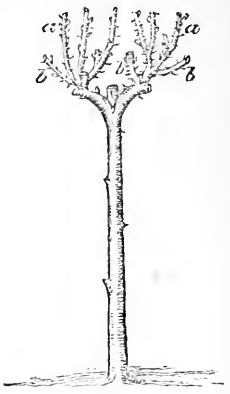

Fig. 54.

It is absolutely necessary to get a strong growth annually on all Roses, in order to obtain fine flowers, especially in the case of the Austrian Brier. But at the same time particular attention must be paid to the specific manner of pruning, or no flowers will be had after all. There are two causes why so many people fail to grow the Austrian Brier well. The first is that the Rose is not grown strong enough to get good flowers, and the second is in consequence of the first failing, the growth not being strong, or rather the ground not being good enough, the Rose cannot supply wood to meet the demand that must necessarily be made upon this class to maintain year by year both wood and flowers at the same time. And as there is not a supply of good wood the flowers are poor and puny, and the indiscriminate way in which it is pruned proves fatal as regards a crop of flowers. This, like all

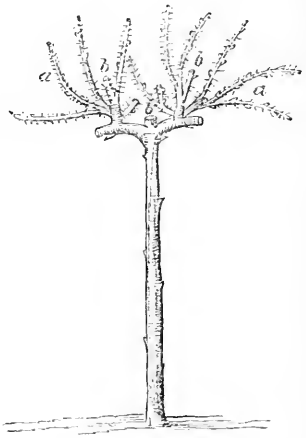

Fig. 55.

other Roses, must be grown strong, and then the knife must be used judiciously.

Fig. 56 is an illustration of a pruned Perpetual, China, Moss, or Gallica Rose. This supposes that the classes are grown strong, but if they are not, then the weak growth must be cut close out, and the flowering wood cut back much closer than is here represented.

Fig. 57 is an illustration of a well-grown and established pendulous or Weeping Rose. The pruning of these Roses consists of two methods. First, if a yearly luxuriant growth can be maintained, then the whole of the preceding year's growth that has flowered may be cut out close to the head, and its place filled with young wood which has been made during the summer. This is what is really wanted in pendulous Roses for a good and handsome flowering specimen. But if the plant will not maintain this, then spurring must be resorted to. In doing this, the leaders *a a a a* of Fig. 57 may remain for two or three seasons, and be spurred in after these leaders have flowered, which they will do freely from every bud the first season after they are made. The lateral growth may be cut back to one or two buds as in *b b b*. In this case a thicker head can be secured as a well-formed and handsome specimen, and an abundance of flowers will be produced for the time; but ultimately some sorts will give a paucity of flowers, and poor ones as well. When this is the case the leaders must be one-half removed at the least, or the head cut off close to its base. The plant should be well manured and a new head of strong growth induced, so as to form a fresh plant; but I always found it much the best plan to get long rods every season, and then to cut the old ones out annually.

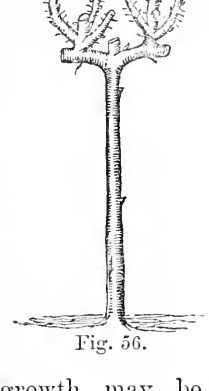

Fig. 56.

The Renovation of Roses worked on the Dog Rose consists in producing an entirely new plant. It always becomes necessary in the course of a few years, more or less, according to circumstances. These circumstances have to do with poor rocky soils and climate. In these soils, such as are found in and about Torquay, and in such a climate, the Rose worked on the Dog Rose as a standard (for there is no other stock which will do for standards) degenerates fast and much more quickly than it does in a colder climate and in clay subsoils. In the former case the difficulty in the way of renovation is greater than in the latter, but in each the only way to reinstate a good favourite Rose is to cut the heads as close off as possible, and to take the plant up. Then cut the roots well in, open a good hole, and put in a barrowful of maiden soil with a little decomposed manure, and the ensuing season a renovated constitution will be developed.

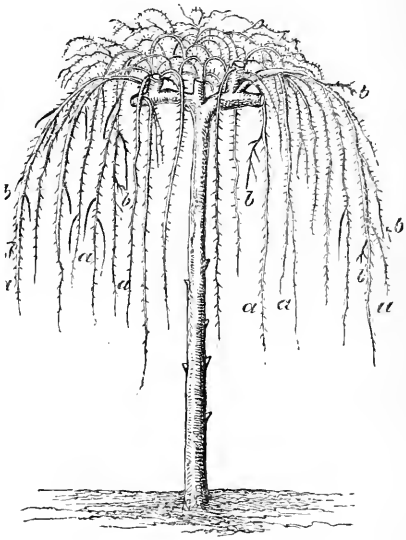

Fig. 57.

Again, if the Rose has degenerated chiefly through the climate—as it will soon do in such exciting temperatures as Devonshire and Cornwall—then cut the head completely off close under where it was budded; let the stock remain for a season, and bud it the next following summer. Let it remain one season if the

ground is poor, then take it up, cut the roots back, and replant it. Thus a good Rose may be obtained. In some climates and soils it is necessary to plant Roses every few years if they are not well managed.

The Pillar and Climbing Rose.

Many of the Roses budded on the Dog Rose make magnificent pillar or climbing specimens, such as *Brennus*, *Blairii*, and *Gloire de Dijon*. There is nothing in all the glorious art of gardening that can equal a well-devised pillar, fifteen or twenty feet high, composed of each of the above-named Roses. They should be worked either on dwarf stocks, close to the ground, or from their own roots, and be planted in deep and rich soil. But the true classes of Pillar or Climbing Roses consist of rather a different thing; and among them I may mention as a guide *Felicite perpetue*, which is a true Pillar Rose.

The pruning of each of those named is different. In the first three cases it is absolutely necessary to induce a strong growth by means of heavy dressings, so as to get some permanent rods as a base to cover the pillar or wall as soon as possible, then to spur them in upon each bud throughout those rods. But in the case of *Felicite perpetue*, and all of this class, which naturally make rapid growth without being so much coaxed to it, a different method may be adopted in pruning them.

The Banksian Rose belongs to this class of growers. It is seldom that we see an old fully developed Banksian Rose bearing a rich crop of flowers; but, on the contrary, we more often find them in great luxuriance, some twenty feet high, covering an extensive wall, bearing no flowers except a few at the top. This Rose may be an exception to the rule, but the proper treatment for a certain annual crop of flowers is nearly identical with *Felicite perpetue*, *Dundee Rambler*, *Queen of the Belgians*, &c. While, however, these last named may be spurred in for two or three years (and a little

longer in some cases), and still insure a moderate crop of flowers, it is seldom the case with the Banksian Rose.

The first season the young rods are made, or rather the season after they are made, an abundance of flowers can be grown from them if they are well ripened, for these will put forth a cluster from every bud throughout the rods, and in the following autumn (the best time, I think) each of those laterals that have borne flowers may be cut back to a bud or two at the base. These will then bear some flowers for one season; but at the base of the leaders, and perhaps half-way up, none, or but a few, will be had from those spurs after this method of pruning. Nothing but pruning on the long-rod plan annually will insure a full crop of flowers upon this Rose; therefore, to be successful in flowering the Banksian Rose, some of the leaders must be cut back nearly down to the base every season, and these will give long rods annually.

This is the proper method of pruning all Climbing Roses, especially for pillars, walls, &c.; but, as I have already observed, most of these Roses may be spurred in for a few seasons, although ultimately no flowers will be had from towards the base of the plant, nor, indeed, for half-way up the rods or leaders. When this is the case *renovation* must be resorted to either in part or entirely. In part, *i.e.* cut one half of the leaders quite down to the base one season; these will give strong shoots, perhaps twelve or fifteen feet long; and the following season cut the other half down. This do every alternate season. It is the only way to insure a full crop of fine flowers from the base of the plant up to the top of each rod.

Chain or Festoon Roses.—Any of the free-growing Roses may be employed for this purpose; but I am of opinion that the best kinds to employ are those that will make strong growth and give robust spurs along these rods, and which will bear flowers successively every season upon those cut-back spurs. And I think none are better adapted for this purpose than

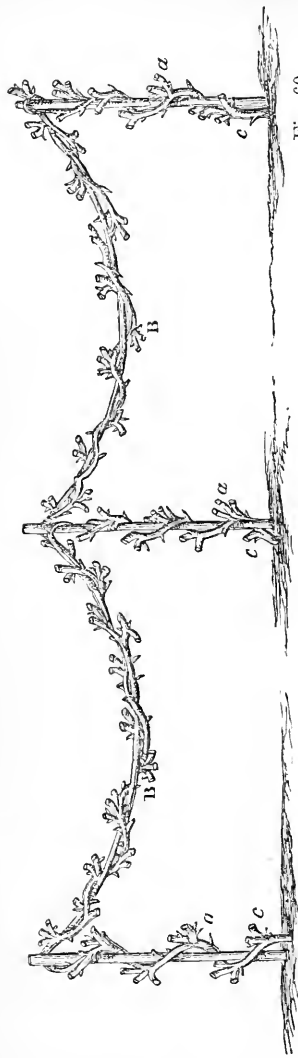

Fig. 60.

Fig. 59.

Fig. 58.

Gloire de Dijon, Brennus, Blairii, Great Western, Jaune Desprez, Luxembourg, Cloth of Gold, and a variety of other *Noisette* Roses. These are, I think, better suited for festoon Roses than such as *Felicite perpetue,* from the fact that when once Roses belonging to those classes have filled the chains, pillars, or arches of wire, they can be spurred in annually all along each main leader.

If the Ayrshire Roses are used, unless a constant vigorous annual growth can be maintained, ultimate failure in regard to flowers must ensue. This will never be the case if the above named, selected from the various families, are used, and good annual dressings with strong manure are given them.

As soon as the flower buds are formed, give the plants a thorough soaking with three ounces of guano to one gallon of water. This will not only develop fine flowers, but also induce strong stuff on the spur for the following season. Then prune this off to a bud at the base every autumn;

thus a constant annual crop of luxuriant flowers will be secured.

Figs. 58, 59, 60 are illustrations of a Pillar Rose pruned on the permanent spur system, *a a a;* B B, the Rose trained on permanent festoons, *Brennus, Blairii, Gloire de Dijon,* &c., being well adapted for this purpose. When the spurs get old and weak, as they will do ultimately (and if the plants appear weak, it would be best to cut them clean down to *c c c*), give the roots a heavy dressing with manure and some strong guano water in the early spring; this will induce the plants to throw out vigorous shoots from the buds at *c,* which will soon fill the pillars and festoon chains or wires.

Thus far I believe it will be found that, as regards the pruning of each class of Roses, every information has been given that is necessary as a guide for those amateurs and inexperienced professionals who often get perplexed in the matter. We often find some beautiful varieties of the Rose giving few or no flowers for want of judicious management.

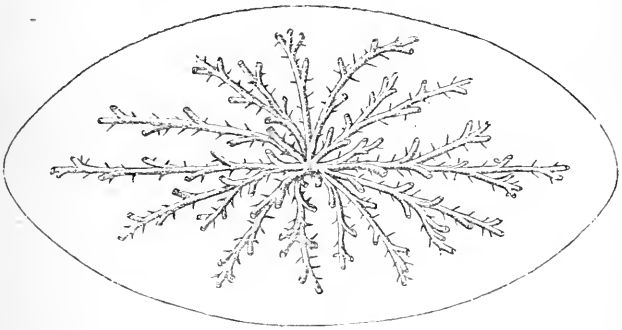

Fig. 61.

An example of a hybrid perpetual Rose planted in a bed, trained down, and pruned annually.

CHAPTER II.

EVERGREEN SHRUBS, ETC.

The Laurel.

Notwithstanding that the common Laurel is so generally grown, either for use or ornament, we often find it most improperly treated. This evergreen and in many respects beautiful shrub is very frequently either badly pruned, or not pruned in due time to maintain its ornamental character.

The Laurel should never be cut in with shears, as is frequently the case; for by pruning it in this manner to reduce it or to keep it in good order, all the beauty of the plant is destroyed by the leaves being cut in twain, and ultimately all the dead points of the shoots that have been cut off with the shears will show themselves.

The clipping of the Laurel with shears cuts the leaves in two and checks the circulation of the sap, and is often a main cause of its final destruction. Let those who do so consider that the leaves of a plant act as do the lungs to animated nature, so that by severing those organs the plant is deprived of its main developing functions; the consequence is a present failing of colour and health, and a final failure of the plant altogether. But when common Laurels require cutting (which they always do to keep them in good condition, and well feathered with foliage below, a feature of much importance in all ornamental evergreens, whether for detached shrubs or for break-fences) it should be done with the knife or a pair of *sécateurs;* only, by

whichever of these tools it is done, be careful not to cut the foliage in twain.

Two or three years after Laurels are planted some cutting back will be necessary, for it is while it is young that a good foundation for a permanent, handsome plant is to be formed. It is of little or no use to allow the plant first to grow to its utmost limit, and then to cut off one-half, or perhaps be compelled to cut the whole of it quite down.

When a Laurel has by some means or other become of no value as an ornament, or useless for the purpose for which it was intended, it is always the best plan to cut it completely down during the autumn or early in the spring. Numerous strong shoots will then spring from the stool. These should be cut back a little in the following spring, to insure a full-feathered plant below.

The Portugal Laurel.

The Portugal Laurel is not such a fast grower as the common Laurel, but it is one of the best of the evergreen ornamental shrubs. It should be pruned through the summer by merely taking off the points of the leaders; this will induce a handsome and close growth. If at any time it gets too bare at the lower part, cut it back during the early spring or in the winter. If standard Portugal Laurels for the lawn are wished for (and for this purpose they are very handsome ornaments), cut off all the under branches close to the stem, but not at the top, and allow the leader to advance as fast as it can. When it has reached the desired height take the top off, and continue to nip out every shoot as soon as it has made six or seven inches of growth. This will induce a handsome umbrella-shaped head, representing an Orange-tree with its dark foliage.

Portugal Laurel fences are remarkably close and beautiful if constantly summer pruned. Never sever the leaves by using the shears, for if so clipped it will utterly spoil the beauty of the whole thing, and render

the effect quite at variance with what it is capable of producing as an ornamental shrub of the first character among evergreens.

Whenever the Portugal Laurel gets out of order, or too large, cut it back to what is desired. If it is cut into the blank and barren wood it does not matter, it will break again quite freely from the budless wood; so that let a plant be ever so old, no fear need be entertained as to whether it may be fatal to cut it back quite into the barren and leafless wood. I mention this particularly, because I have found those who have been diffident about severely cutting back old Portugal Laurels.

The Arbutus.

The Arbutus is a shrub that will soon get barren of foliage below if not prevented from doing so by due attention. Generally we find the Arbutus an eyesore in good grounds rather than a beautiful evergreen ornament, bearing both flowers and scarlet strawberry-like fruit at one and the same time. To prevent it becoming barren in this way some annual pruning will be necessary. As soon as the plant has grown to, say, two feet high, nip out the leaders of all the principals, and continue to do so every summer or early in the spring; by this means a handsome and symmetrical plant may be maintained for an indefinite period.

An old barren plant may be renovated by cutting it quite down to within a foot of the ground, or by shortening in the limbs, similar to Fig. 62. The line *a* indicates where an old Arbutus may be cut down to, if not past age and not decayed. It will generally give young growth at the base after being cut down, if it is sound. Early in the spring is the best time to do this.

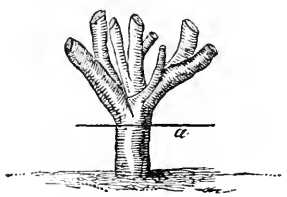

Fig. 62.

The Bay-tree and the Laurestine.

Both of the above may be treated in a similar way as regards the management of the plants, as they are somewhat alike in their constitution. To form good specimens of each, some little attention must be paid to them while they are young. Taking out the points of the leaders for a few seasons will induce a bushy habit, and cause the plants to feather themselves well down to the ground, in which consists the beauty of all evergreens. If at any time either of these shrubs gets overgrown and barren below, cut it quite down to the ground, or to within a few inches of it, and an entirely new plant will be formed. This cutting down should be done in the months of March and April. It must not be done in the autumn in cold counties, as probably it would expose the stools to a severe frost, which might kill them.

The Holly.

Some difficulty attends old Hollies in the pruning of them, especially some of the choice sorts. If some of the variegated kinds are allowed to get too old before they are pruned into a pretty shape, it will prove fatal to the beauty of the plants to cut them severely; but if the points of the shoots are taken off while they are young, beautiful, symmetrical, and thick-foliaged specimens may be formed. The Green Hollies, if cut quite down to the ground, will throw up an abundance of young shoots; but this kind of pruning of the variegated sorts can never be done safely, because they are all grafted on the common green kind, and if they are cut down to the stock they will throw up green stuff instead of variegated foliage.

The pruning of Hollies should be done through the summer, when they are growing, but not too late. Time should be given for them to make some growth at the points. Nipping out the ends of the shoots is the best way of pruning the Holly.

The Double Furze.

If the Double Furze is to be kept in good and continuous order for many years, it must be well looked after in its early stages. I was well acquainted with some grounds where there was an ornamental Double Furze fence planted as a finish to a wall adjoining the public road, which road was much lower than the grounds, so that the soil was on a level with the top of the wall. On the top of this wall was planted (of course inside in the soil) a row of Double Blossom Furze, forming for a great length a hedge quite thick, which, when in flower, was one of the most splendid and singular objects conceivable in the course of a day's ride by railway. Well, this beautiful flowering fence was getting at last beyond its limits. Now, what was to be done to reduce it? "Why," said some one, "cut it down to the ground, it will shoot up from the root." Alas for the attempt! which proved a mistake. The fact is, if the Double Flowering Furze is allowed to get old and barren and hard-wooded below, it is ten to one, if it is cut down to the ground, but that it will die.

The proper time for pruning the Double Furze is as soon as the bulk of the flower is over; but in the young stages of its growth merely cutting out the points of the leaders with a *sécateur* frequently is all the pruning that is required to maintain a well-feathered specimen down to the ground for many years. Nor can a more beautiful ornament on a lawn be found than this shrub when carefully attended to while it is young.

The Berberis.

There are two classes of the Berberis, the one evergreen and the other deciduous. Some of the latter are not very ornamental shrubs, but *Vulgaris* is useful on account of its pretty fruit, which is of a nice acid when used as a pickle. The evergreen varieties are useful, and many of them are beautiful ornaments, fit for the most prominent places in the pleasure garden, and among these none are more so than *Darwinii*.

The pruning of the strong-growing deciduous kinds consists in cutting-in early in the spring to a good shape. The evergreen varieties may be frequently nipped in at the points of all the leaders to form handsome symmetrical specimens. Old deformed plants may be renovated by severely cutting back in the summer after the flowering season is over.

The Tamarisk.

This is a rather strong-growing shrub of the deciduous kind, being of a beautiful light green colour, and having a fine foliage.

The pruning of this shrub or low tree must be well attended to, or it will grow quite out of good order, shape, and form. The proper way to grow the Tamarisk is to make a standard of it, and then to prune it early every spring by cutting back the long branches. All the dead wood in the tree must likewise be cut out. By this treatment it will present quite a different appearance from what we generally find it. The Tamarisk is a miserable-looking tree if neglected, while a little annual pruning completely alters the case in every respect.

The Escallonia.

This is one of the most beautiful flowering evergreen shrubs we possess. It is of a free growth, thick, and of a dark green foliage, being also a most prolific flowerer. In the midland and northern counties a sheltered wall is required for it, but in the south it flourishes without any protection through the winter. *E. Macrantha* is a fine and red-flowering variety, being profusely covered with flowers as handsome as a Heath.

This shrub requires annual pruning similar to a soft-wooded Heath, *i.e.* merely nipping out the points of the leaders, which will induce a thick and compact growth, with an abundance of flowers. Old overgrown plants may be cut back severely, in which case new ones will be quickly formed.

The Garrya.

This evergreen shrub has the appearance of an Oak as regards its leaf. It is exceedingly handsome in the early spring on account of its long, pendulous, and graceful catkins, which are produced on the preceding year's growth in great abundance, giving to the plant an air of beauty not often found among this class of hardy shrubs. A shrub of this kind nicely trimmed up to a four or five feet clear stem, having a symmetrical, umbrella-shaped head, and in good health, and placed on a lawn, forms an object worthy of such a situation where it can thus display its character.

Fig. 63.

Its pruning consists in carefully cutting-in any points which are calculated to distort its true symmetry. Overgrown and old plants may be cut back, as in Fig. 63, which represents the Garrya as a lawn tree. This may be taken as an illustration of a well-trained specimen which has grown freely, and been annually pruned.

The Acacia.

There are two classes of the Acacia, one that bears pea-shaped flowers, and the other imperfect flowers, *i.e.* those which have no perfect petals, but are composed of brush-like flowers. Each of these classes requires similar treatment in the pruning. The points of the shoots should be nipped out while the plants are young, in order to obtain compact and symmetrical plants. But in the event of a plant getting overgrown it may be cut back severely, when, if not

too old, it will break into fresh growth, thus forming a new tree.

There are some that are remarkably handsome in their foliage and general character. One in particular is called the *Locust-tree*, which is very beautiful as a lawn tree.

Fig. 64.

Fig. 64 is a fair illustration of the tree, which in the summer is densely clothed with foliage as thick as possible, with its overlapping pinnatifid, bold-featured, and dark green leaves, giving the tree a singular and uncommon appearance, different from all others.

Fig. 65 shows a feature of the seed pod of this tree, which attains to as much as nine or ten inches in length, and an inch wide, and comes on the tree in numerous clusters, which are, when nearly ripe, of a beautiful scarlet colour, giving to the tree a splendid appearance. These seed pods become of a mahogany colour as they get older, which gives a richness to the appearance of the tree. I had some pods of this seed sent me in 1878 from Texas, where the trees grow in abundance. I strongly recommend this beautiful-foliaged plant as a lawn tree in sheltered places.

Fig. 65.

It may be necessary to cut it in at times, or even to thin out some of the branches, and this should be done in the spring.

On the Pruning of the Coniferæ.

All the Coniferæ will bear the young growth stopped at the ends of the branches, but not any severe cutting back or pruning into the old wood, with a view to obtain new growth in order to renovate the plant. The *Pinus insignis* will bear more pruning than most of the Pines, but no attempt must be made at cutting it back into the old wood.

The Pines and all the *Abies*, as well as the *Cupressus* tribes, may be stopped at the ends while the plants are young, with a view to induce symmetry of character, or to obtain a limited development of the specimen.

It sometimes happens that a beautiful specimen is found to be planted in a spot where a very limited space can be allowed it. I have often seen this, when not knowing what to do, or through not actually attending to the early pruning of it, and the valuable plant has had to be cut down. I have seen a *Pinus insignis*, valued at £100 or more, destroyed on this account.

Once for all, I have to repeat that all the *Coniferæ* may be pruned, but only by stopping the young growth, or by very careful knife-pruning of the young branches during the early stages of the growth of the plants. Old branches may be thinned out, but not with the object of obtaining new growth from them.

The Thorn.

It often happens that a fine standard Thorn gets beyond its bounds and intrudes upon some other object. Whenever this is the case, prune the plant as much as you choose, there will be no danger of such a course being fatal to it. When a specimen

has exceeded its limits it is a good plan to cut it back, so as to get a new symmetrical head. The same may be done when it has become old and poor.

In reference to Thorn hedges much may be said. For the first few years after one of these has been planted some careful attention must be paid to the cutting back by closely clipping it, or no good fence can be obtained. It is necessary, after the hedge has been planted one year (or two years at the most), to cut it down to within a few inches of the ground to induce a bushy and thick growth close to the ground; then after a season's growth the young hedge should be clipped on the top, but not much on the sides. After this it is only necessary to run the hedge-shears over the top, taking off a few inches to induce a thick growth; this must be done annually, two or three times during the summer growth, until it attains to the desired height, to which it must be kept by summer clipping every year. The same thing applies to the Privet hedge.

The renovation of old hedges is best effected by cutting them quite down to the ground, or to within a few inches of the surface of it. Cutting out some of the old fence and leaving here and there a long branch to plash down is bad hedge management.

The Spanish Broom.

The Spanish Brooms, both the white and yellow, are remarkably beautiful as ornamental flowering shrubs. As detached plants on lawns they present a singular effect when in flower, for being of a very flexible nature they are easily moved by a slight breeze, and when they are in full flower this has a most fairy-like appearance in the graceful wavy motion of the flower spikes. They also form superb four-feet standards, when grafted on the Laburnum, for the lawn.

The pruning of these Brooms requires some little care—annual cutting back of the dwarf plants being

necessary. This should be done immediately after the flowering is over, so as to give the plants time to make new growth, and to ripen that new growth before the winter. They may be cut back to any extent.

As grafted standards, a somewhat different plan must be adopted in pruning them. These should be well or quickly grown; then, as soon as they have done flowering, thin the head out, leaving long leaders and sufficient laterals towards the crown of the head to insure a healthy supply of young wood for the following season's flowers, in a similar way to which the climbing Rose is treated. When the leaders get too long and barren cut them back. It will be found necessary to thin these grafted Brooms out annually, or they will soon get too thick and full of dead wood, when they will lose their graceful character as lawn trees.

The Weeping Willow.

The Weeping Willows are most beautiful objects when well grown. It is frequently necessary to prune them to prevent deformity in their appearance, for they will often grow irregular, doing this more on one side than on the other, and so on. Some judicious pruning will be necessary to prevent this—severe cutting back in some instances, and no cutting at all in others. Thus a plant may be made to grow in a symmetrical form. Old and deteriorated plants may be cut back severely to induce a new development altogether; and some frequent thinning out will be required to induce an equal and graceful habit.

The Weeping Ash.

What has been said about the management of the Willow applies to this, except that completely cutting it back may not be advisable, nor even necessary. When a Weeping Ash is to be planted a good deal of

preparation of the soil is needful, such as trenching deep and turning in a good lot of manure. This will induce a vigorous development of the head. Some pruning out of the irregular and stubborn growth will be necessary at first, and also some training of the shoots while they are growing will be required by placing a hoop over the head, to which tie the shoots in a regular manner.

Well-developed and old plants require frequent thinning out, and the dead wood annually cut out. Very often stubborn upright shoots will spring from vigorous old specimens at the crown of the plant. These should be cut clean off as close as possible to the base from where they spring; for if these sporting shoots are merely cut back to within an inch or so, they will continue to give the same class of wood for years, which detracts much from the proper growth and character of the plant.

The Judas-tree. (*Cercis Siliquastrum.*)

In Texas, U.S., this variety grows in abundance, and is to be seen there in the spring, before the leaves appear, most conspicuously covered with its pink-red *papilionaceous* flowers. These spring from the hard or ripened wood all the way up the branches.

This tree is of a beautiful deciduous kind, not of large growth, but it may be utilised for small places if it is pruned annually by cutting back any strong growth and reserving the medium young wood for flowers. It will bear the knife well in this way, so that the tree may be made to suit any place. Old plants may be severely cut back.

The Magnolia.

All the Magnolias will bear the knife, but I now chiefly refer to *M. Grandiflora*, a fine and popular variety, much grown in this country on walls. It is certainly a noble-foliaged species, producing grand

flowers, but, except in the milder southern and western counties, only to a small degree. It requires to be thinned out and the wood well ripened in order to get these flowers.

The chief object in growing Magnolias should be to induce them to make a moderate growth annually after they have done flowering, and to form terminal buds similar to the Camellia. Annual pruning is necessary, cutting away old worn-out spray, and cutting back all plants generally, for the Magnolias are much inclined to make wood at the extremities like most other plants, and they will get barren of flowers below if not carefully pruned every season immediately after they have flowered. Thinning out, cutting back, and spurring in, and giving the plants some strong liquid manure at the same time, will induce a vigorous growth from the spurs, which will be terminated by a flower bud by the autumn. By these means they may be kept at a medium stature and well feathered with foliage below, with an abundance of flowers. Some are afraid to cut the Magnolia much, as others would be in the case of the Camellia; but I have cut it back severely, and with good results.

The Ailantus.

This beautiful pinnatifid leaf tree has but few allies, and of those not many are known; and although natural orders have but little to do with general appearances, yet it is often desirable that some idea should be given of a plant by a near neighbour or other person.

The *Ailantus*, or "Tree of Heaven," as some term it, on account of its lofty stature, is a fine and graceful tree. It is allied to the shrubby Trefoil (*Ptelea*); natural order, *Xanthoxylaceæ; Xanthoxylum*, the type; a *Dicœcious* plant. The *Ailantus* is a handsome deciduous lawn or near park tree, with beautiful light foliage. But little pruning is necessary for it; in its early stages, however, it will require some attention in order to form a really handsome specimen.

The Rhododendron.

The Rhododendrons are seldom cut back except for layering purposes, when of course it is done annually as the layers are taken off. While young they may be severely cut back to form healthy dwarf plants, when they are growing in good peat land; but if they get old and are not growing in suitable soil severe pruning, with a view to obtain a new plant, will be all but futile.

It is true some of the common sorts may be severely cut back if on their own roots; but cutting back or pruning at all beyond regulating the growth of the plant in the case of the choice sorts which are grafted, and stopping them to form handsome specimens, will be even dangerous.

Standard Rhododendrons will require stopping while they are growing in the same way as the Azalea is managed, to induce symmetry of character. But whenever either the Rhododendron or the Azalea requires this it must be done as soon as it has made an inch or two of young growth, and not much afterwards, if flowers are to be expected in the next season. Sometimes a plant will grow contrary to the formation of a symmetrical plant. It will grow too much on one side, and not enough on the other. In such a case the knife must be used to cut out any unequal and fast growth, and to induce a uniform growth all over the plant. Symmetry in the character of the plant enhances its beauty quite as much as an abundance of flower, or even more so. I am sometimes disgusted when I see a good specimen spoilt through inequality of character, just for want of a little care in the early pruning and training. Some people are fearfully timid about cutting plants—even professionals are—but if they will but study their nature they will get out of that, and soon cut with judgment. It is seldom that we see good pruning either in regard to fruit trees or shrubs among ordinary gardeners, especially the jobbing hands. It is not always the gardener's fault, for ama-

teur lady gardeners frequently overrule their better judgment.

Pure peat or decomposed leaf-mould, sand, and fine maiden loam of a sandy nature are absolutely necessary for growing the Rhododendron successfully. Pure peat is a natural compound of the three above-named materials, in which alone the Rhododendron, Azalea, Kalmia, Heath, &c., will grow well, and when they are planted in this natural compound they flourish differently from what they would in a soil less favourable; and in such soils more luxuriance of the species is the consequence. When this is the case pruning may be carried out with more confidence, because there will be no doubt about the plant benefiting by it; severe pruning even of old plants may be effected.

If Rhododendrons cannot be induced to grow freely, the flowering will not be so good, while, on the contrary, if they do grow freely, pruning may be resorted to, to form dwarf bushy plants, and to maintain an abundance of foliage near to the ground, which adds much to the real beauty of the species.

The Azalea.

There are two classes of the Azalea, one hardy and deciduous, the other less vigorous and evergreen. The hardy varieties generally come from America, and the greenhouse species from India, China, &c. In addition to the many varieties originally forming these classes, there are numerous garden hybrids which totally eclipse the originals in regard to colour and in the size of the flower, as well as in quality, many now being equal to some of the old semi-double Camellias, and as good, or even better, than some of the old Roses, to which some might be fairly compared. They are easy to grow, and no one possessing a greenhouse, or a space large enough to form a bed on the open lawn, where half-a-dozen or twelve plants can be planted, should be without them.

They require the same soil as the Rhododendron. All will bear the knife well, and a plant may be made

to assume any character you please by pruning and training. If you wish for very dwarf specimens, cut them back; if dwarf standards, select a main centre shoot, and cut away all the others clean down to the crown of the plant, and train this up to whatever height you please. Then form the head by nipping out the points of all the leaders, and continue to do this as soon as three inches of young growth are made. Thus a clean stem, with a nice compact umbrella-shaped head, may be soon produced, forming a handsome plant. The same may be said of producing standards of either class. The advantage of standard and half-standard Azaleas is that, having two or three feet of clear stem, there is room under the head for other dwarf plants, thus giving variety and a protracted season of flower on the same space.

Old-established plants may be watered once or twice during the early growing season with liquid manure, but not after the terminal bud is formed. Old dwarf plants that have become poor may be cut down to the ground, with a view to reproduce new ones, so long as the root is healthy and the soil is good.

The Hibiscus.

These plants are among our most beautiful flowering shrubs. Many of them will compare with the Carnation, and are worthy of a place in every garden, whether it be large or small. The situation should be a warm one, and the soil of peat and good loam (top-spit soil from a good dry common or pasture), of equal parts, and good drainage, although they require an abundance of water while growing.

They may be pruned to any extent, to induce good, healthy, and compact plants. I refer here to the shrubby kinds, for this genus embraces annuals, perennials, and dwarf woody shrubs. They will flourish exceedingly about such places as Torquay.

The Cistus.

This family comprises many useful and handsome plants. Nothing can be more beautiful or better suited for furnishing rockeries and for dry banks than the procumbent varieties of this tribe, varying, as they do, in colour, and forming very pretty objects on stone-work. Some of the erect-growing varieties are beautiful low shrubs, most conspicuous when in flower—for example, the *Gum Cistus*, which is well known on account of its large white flowers, conspicuously marked with rich patches of puce, giving it a remarkable and striking appearance.

The Cistus will bear pruning pretty severely, but I advise that the erect species be annually shortened at the leaders during its growth, which will have the effect of producing a more compact and uniform character than is generally seen. The procumbent varieties may be cut back to induce symmetry of character, and also to prevent barrenness in the foliage and flowers in the body of the plants. This pruning or cutting back severely should be done at one time, and that should be in the month of April or the beginning of May.

The Daphne.

There is no class of plants that can or does command more interest than the Daphne, excepting the Violet.

The Daphnes are durable as shrubs, and very ornamental and beautiful as flowers in the parterre, being also effective as perfumes. A good plant of *D. Mezereum* is sufficient to perfume a whole garden of a moderate size, and one plant of *D. Indica* will do the same for a whole conservatory.

Many of them are handsome evergreens, and fit for the select shrubbery. They are as a rule of slow growth, therefore a small amount of pruning is necessary. Some little cutting back will be needful with old plants, and nipping out the points of some of the plants when growing. The *Mezereum* and *D. Laureola* will

bear the knife well, and may be cut quite back occasionally. *D. Indica* may be pruned moderately. It should be done immediately after flowering.

The Deutzia.

The *D. Gracilis* is well known, but the genus as a tribe is but little grown, although many of them are equally as handsome as *Gracilis*. This, however, happens to be a free-flowering dwarf shrub, useful for pots as an early forced flower; and a handsome variety it is, if pure white can be called handsome. *D. Corymbosa* is also a beautiful flowering variety, and it makes a most delightful standard lawn tree of three or four feet high when tied to a stake or iron rod. Nor can few flowering shrubs well compare with a nicely grown plant of this kind on a neat lawn when in full flower in the spring.

Good ground, consisting of a little peat and decayed manure mixed with the ordinary garden soil, and well prepared before planting, should be given these plants. Every season a good top-dressing of rotten manure should also be given these standard Deutzias, together with one soaking of liquid manure immediately after flowering, to induce a fair growth of young wood, on which will come the best flowers.

Pruning is likewise absolutely necessary with the Deutzias. These two principles must be maintained in growing them, viz. a free growth annually, and pruning out the old wood to be substituted by the new. This applies to the potted plants as well as the outdoor shrubs.

The Genista.

The Spanish Brooms are Genistas, but I now refer more particularly to the greenhouse varieties and to a dwarf section of this tribe. *G. Canariensis* is one of the best, if not the best, of the greenhouse varieties. This plant forms a most gorgeous pot plant when in flower in the early spring. It is one of those free-

flowering evergreen shrubs that are necessary in every collection of plants to supply both sprigs of beautiful foliage and flowers at the same time for bouquet-making. This variety will never disappoint the grower of flowers, for the plant will flower whether it is large or small.

To obtain a fine, well-formed, and large specimen, frequent stopping of every leader through the growing season up till September must be resorted to, when the stopping may be discontinued till after the flowering is over. The plant may then be cut back freely to preserve compactness of form, and encouraged to grow, the stopping being continued; thus a beautiful specimen will soon be obtained.

All the Genistas require frequent or annual pruning. Even *G. Tinctoria flore-pleno* and the other procumbent varieties also require some annual pruning to preserve a healthy state of the plants. Cutting out old dead wood and the annual thinning of the plants are necessary in good gardening, in order to maintain healthy specimens, and for the further development of their character. What a miserable state of things do we generally see in shrub culture among amateur gardeners, except in the case of the few who keep good men as gardeners! The most beautiful plants pass unnoticed because they have no attraction through neglect of judicious pruning, which is the only way to bring about a good state of shrub culture, and the only thing to preserve it.

The Buddlea.

The *B. Globosa* is a general favourite on account of its pretty round balls of orange-coloured flowers, which are produced freely, but the plant has a wild growth with it which renders it unfavourable to some places; this, however, may be easily controlled by the knife. It is classed by some among "Herbaceous" plants, which is an error; for it is decidedly a woody shrub, and attains to the height of five or six feet.

If this plant is annually cut back in the early spring,

say in March or April, according to the season, the species may be made subservient to any circumstances. It will bear any amount of cutting back, so that it may be made to suit the place, whether it be large or small; and a more beautiful flowering dwarf shrub could scarcely be had when it is in bloom, showing as it does its perfectly round balls of bright orange flowers above the foliage.

The Ribes.

The *Ribes Sanguineum* is the only one of this genus worth possessing. Its treatment as regards soil and pruning may be the same as that of the Black Currant, but as it is not a fruit it is used as a flowering deciduous shrub. This unfortunate plant is mostly treated in the same way as many other beautiful shrubs, *i.e.* merely planted among a number of others that overcrowd and starve it; and you may see it pushing a small limb or a few twigs through some shrubs that do not flower with much effect, or not at all, which seem almost to say to the poor *Ribes Sanguineum*, "Keep back, I am jealous of you." If those who possess such a shrub would but plant it in good ground, and fairly prune it annually as I have directed for the Black Currant, and give it some open conspicuous spot, I can vouch for a splendid spring display of its racemes of red flowers, which at a distance might be taken for pendants of coral.

Old plants may be renovated by completely cutting them back, which will produce a new tree. The flowers come on the preceding year's growth.

The Hydrangea.

To succeed with the Hydrangea, one part metallic peat and one part maiden loam are required. By "metallic peat" I mean peat containing minerals, such as iron, tin, &c. This kind of soil will produce the beautiful blue colour, so much coveted in some parts, in connection with this flower.

Some profess to distinguish the blue as a distinct variety, but I have proved it to be otherwise. The common pink-flowered kind will produce the blue under these circumstances, and go back again the following year by planting it in other soils; and if the reader purchases a blue Hydrangea in flower, it will produce pink ones the next season unless it is shifted into fresh metallic peat.

The *Hydrangea* is no doubt one of our best hardy border plants, and should have a bed among flowering shrubs in every well-devised garden. The pruning of it consists in cutting the previous year's growth back to within a few inches of the ground, and then to top-dress the bed with decayed stable manure.

The Myrtle.

The Myrtle is too well known to require any description here, but in some parts of England no idea can be formed of what it does in the western counties. About Torquay the Myrtle is grown as a common lawn shrub, where it attains to the height of eight or nine feet.

It requires some annual pruning to prevent it from getting barren of foliage below. In the month of March or April, according to the season, go over the plants and cut back all the main leaders; this will promote a young and healthy growth below. Old and overgrown plants may be severely cut back to any extent with a view to obtaining new plants. No one need be timid about cutting back the Myrtle, for it will bear it well.

The Coronilla.

The *Coronillas* are not to be seen growing as shubbery plants in some parts of the country, but in Devonshire they are common border shrubs. *C. Glauca* grows to a good-sized medium shrub at Torquay. It is a plant that requires some little annual cutting back to keep it compact and symmetrical. It makes a handsome shrub on the lawn as a single specimen, flowering

as it does abundantly, as well as being luxuriant in foliage.

The Fabiana.

The *F. Imbricata* is reckoned amongst our half-hardy shrubs, but it is quite a hardy one in the West of England, and grows to a moderate-sized dwarf shrub. It is a very pretty Heath-like evergreen, bearing an abundance of white flowers. It prefers a dry soil, consisting of loam and peat, and requires similar management to a hard-wooded Heath, although it does not belong to that tribe. By nipping out the points of the leaders a dwarf and handsome compact plant may be obtained. It may be cut pretty severely, with a view to renovate an old deteriorated plant. The stopping should be done after flowering.

The Kalmia.

The Kalmias are peat-loving plants, nor can they be grown well without it. They are no doubt the most exquisitely formed flowers we have among our hardy shrubs. They are not particular as to situation, but suitable soil must be provided for them, or failure will certainly ensue.

They will do well in a group with the Azalea, although the Kalmia is of slower growth than that plant. They may also be planted on the outside of the bed when grouped with the Azaleas.

Very little pruning is required for the Kalmia. In the early stages of its growth some stopping of the leaders may be necessary to form a symmetrical and bushy plant, well feathered below with foliage. This stopping should be done as soon as two or three inches of new growth have been made.

The Andromeda.

This is a genus of very pretty shrubs, while some are trees belonging to the natural order of Heaths, although

not much like them in their general appearance. But as all natural orders are founded upon structural affinity, the Andromeda resembles the Heath in the flower, though not in the foliage. The strong-growing kinds need cutting back to induce compactness of habit and uniformity of growth, such as *Floribunda*, a general favourite, which merely requires stopping the leading shoots to form a handsome dwarf plant. It delights in peat soil and is an abundant flowerer, well worthy of a small bed in the parterre, or as a front row round a Rhododendron or an Azalea bed. Old Andromeda plants may be cut back when they require to be renovated.

The Lavender.

The Lavender is a general favourite, and is much cultivated for an essence made from it. It is also used for perfuming ladies' wardrobes, &c., the flowers being dried for that purpose. It will grow in almost any kind of soil, but delights most in good light ground.

The Lavender requires to be cut back every season, in order to keep the plants of a dwarf character and well feathered with foliage below. Severe cutting is never necessary except in cases of old, overgrown, and neglected plants; merely cutting back a few inches in the month of March is all that is required to preserve compactness of character in the plant, and to insure a vigorous growth, so that it will produce a fine bloom.

Plants raised from seed are more productive of flowers than those grown from slips or cuttings. The first and second seasons after they are raised the seedlings should be cut pretty close back to induce a dwarf and bushy habit. The plants may be cut back after the flowering is over if previously omitted, for late pruning of the lavender will not do for the flowers.

The Spiræa.

The Spiræas are a beautiful class of plants, very little grown, except the *Japonica* and one or two more; but

as a tribe they are well worthy of a place in every select shrubbery, or as detached plants in the parterre, especially *S. Ariæfolia* and *Lindleyana*. There is no class of flowering shrubs that is more beautiful than many of these.

The shrubby kinds require some annual pruning in the month of March to regulate the growth and to keep them of a compact character. Cutting back annually should be done to obtain this object, and handsome and healthy plants will be the result. The young wood should not be cut off, but left on, merely cutting back the older branches, or shortening in, as it is called.

The Heath.

The Heaths require pruning annually to induce a handsome growth. The soft-wooded sorts must be pinched back while the young growth is being made, and some careful pruning must also be done; but if a plant gets old and barren of foliage below, it will not bear cutting back into the old wood, for if it is thus pruned with a view to renovate it, nothing but disappointment will be the result. None of the Heaths will bear such severe pruning, and they will not break into good growth from the old wood.

All classes of Heaths must be carefully pruned while they are young, or, at least, no severe pruning must be done upon old ones at any time, nor with any class. As soon as they have done flowering, whether they are either indoor or hardy sorts, they should be pruned by carefully cutting them back only so far as to leave a good stock of young stuff on the plant. Hardy Heaths should be cut in, so as to maintain a compact and symmetrical plant. The autumn-flowering sorts may be done in the spring, and the spring sorts immediately after flowering.

The Thyme.

Some may think it a very small matter to write about pruning, or to include the Thyme in a work on

this subject. But from many years' observation of this common and popular plant, I see the greater reason for the remarks concerning it, than upon most of the others. Nineteen out of every twenty who grow this herb seldom treat it properly as to cutting it in; the consequence is that they generally lose the plants after one or two years.

Thyme, as a pot-herb or as an edging to flower beds, can never be preserved in a healthy and permanent condition without due attention to the *proper time* for cutting it back. I now refer more particularly to the erect-growing sorts. The Thyme plants should be all cut back not later than the middle of August, cutting them down pretty close to the ground; if in single plants or in beds, take hold of each with the hand, gathering up the entire plant (if not too large for one handful), and holding it quite tight, then with a sharp pruning knife cut the whole of the top off evenly to within three or four inches of the ground—three inches are enough as a rule—then move the surface of the ground a little and give a little top-dressing, and by the winter the plants will be well clothed again with an abundant young growth ready for use. They will not then suffer from frosts, as they do when cut back later; and if not cut back at all they exhaust themselves, get deficient of young stuffing Thyme, and ultimately die.

As an edging the upright kinds may be clipped with the shears, as is done with Box edgings, not later than the time named above.

The Golden Thyme, when grown as an edging, must be cut into a state of neatness and compactness by line for a straight edge, and with the edging knife or a pruning knife if otherwise planted. But the annual cutting back must not be neglected in either case if you wish to preserve Thyme in good and permanent order.

The Sage and Savory.

Each of the above pot-herbs requires annual pruning or cutting back. Sage, as a rule, is best when used in

a green state; therefore it must not be cut back before the spring, say in April or May. The Savory (Winter Savory) may be treated in the same way as the Thyme. The Sage should be cut back, and then some manure forked in. *Rosemary* and other shrubby herbs may be done in the same manner.

The Pruning and Cutting Back of the Box-tree.

The Box is a very ornamental class of trees. They are generally clipped with the shears, and this may be done without much disadvantage to the beauty of the plants, but, as a rule, some sorts are by this method divested of that peculiar feature which is so striking in most of the varieties. The variegated kinds, especially *Variegata pendula*, would be literally spoilt if clipped with shears, and so would *Balearica;* but the small-leaved green varieties may be clipped.

The ones named should be carefully cut over with the knife, as by this method the leaves are preserved intact, in which consists the beauty of all flowerless shrubs. The pendulous sorts can never be clipped without a serious loss. The kinds that may be clipped, as well as Box edging, should be done not later than June—about the third week in the month; then they will have time to get sufficient new growth to protect the parts exposed by the clipping. If it is done later there is the risk of the edgings or plant being exposed to frosts, and being materially injured, if not killed by them. I know of an instance of this at the present time. Some Box edgings being clipped too late, the frosts have injured them considerably, and they look very bad, as though they had been scorched by fire.

So many of these mistakes occur in pruning, clipping, and cutting back the Box-tree, or through not doing it at all, that I have been induced to make these remarks on the matter.

PART IV.

THE PRUNING AND RENOVATION OF HARDY CLIMBERS.

The Ivy.

The Ivy as a genus is both useful and beautiful. I need not attempt any description of it, for other writers have done that well—Mr. Shirley Hibberd, for instance, who has, I believe, done ample justice to this tribe, although I have not seen the work in which he treats of it. Suffice it to say that the Ivy is a peculiar and wonderful plant. A lady I knew very well had it trained on the walls of her sitting-room, where it seemed to thrive; and I have known old houses covered so thickly with it that no water or damp could get at the outer walls, which would no doubt have admitted a great deal of water during heavy rains had it not been there.

The pruning or clipping of the Ivy is an essential thing to its well-being as well as to its beauty. There is a sort that will do without much of this, viz. the small-leaved *Helix*, or common British Ivy, a beautiful, close-growing, cut-leaved variety; but the Irish Ivy, a kind commonly met with, requires an annual clipping if grown on houses or walls. Knife-pruning is necessary in cases where the Ivy is grown as an ornament on arbours, old trees, fences, &c., but where on walls or buildings it should be annually clipped close, the month of June being the proper time to do it, when

there will be time for it to make new foliage (which is very beautiful) before the winter.

All pruning should be done to every variety of the Ivy at the same time, then no loss will be incurred. It is necessary to cut back and clip Ivies annually, to keep them in good order, for most of them will run into growth at the extremities and get barren below if left unclipped or unpruned.

The Honeysuckle.

Any lengthened description of the Honeysuckle is almost useless, as it is pretty generally known and appreciated by everybody. The uses of this tribe are of one kind as a rule, and that is as climbers and twiners. Twiners they are in the true sense of the term. I have no doubt but that most people have at some time or other observed how completely and strangely the common Woodbine will twine itself round a rod of growing Birch or Oak, and nearly bury itself in the rod, by the non-elasticity of the Woodbine and the rod of Birch, &c., continuing to grow until a perfect thread is formed on the rod. This shows the strength of the longitudinal fibre of the Honeysuckle. The Honeysuckle flourishes and flowers best in a warm and dry soil.

The pruning of it is a matter which has elicited many inquiries, some of which have recently come under my own notice in the various journals. The Honeysuckle gives out its flowers upon the short laterals produced upon the well-ripened young wood of the preceding summer's growth; consequently the pruning must consist of shortening to a moderate extent the last year's wood, and in no case must the preceding year's wood be cut back severely.

Again, after the laterals have borne flowers they may be spurred back to an eye or two for a second crop of flowers, which they will produce in the following year if they are strong, but if not these leaders should be cut clean out and new ones substituted for them, which is the best plan.

There is a similarity between the pruning of the Honeysuckle for a crop of flowers and that of the Grape Vine for a crop of fruit. The well-ripened leaders of each produce the best results as a rule, but strong laterals spurred back will also do well.

When the Honeysuckle is grown as a bush in a pot, it is necessary merely to cut out some of the leaders, and then to train the well-ripened young ones round five or six sticks or on a globe trellis, but not to cut the whole of the last season's growth back to a long spur. This is the reason why so many people fail to get flowers.

The Virginian Creeper.

The Virginian Creeper is largely cultivated to cover walls where little else will grow. This creeper will thrive in close and confined places, such as are to be found in our towns and cities. It is remarkable for the peculiar change in the colour of its foliage in the autumn, which makes it very desirable as a decorative creeper. But little pruning is necessary, and this consists in cutting back some of the old leaders, thinning out, and spurring in, similar to the pruning of the Vine. It should be done late in the autumn or in the early spring.

The Clematis.

There is no class of hardy climbers so beautiful as the various tribes of the Clematis, diversified as they are in character and colour. Of late years this family has advanced amazingly as regards the character of its flowers.

They are a most accommodating class of climbers, being well suited to both the indoor and outdoor decoration of walls, trellises, &c., while for permanent beds nothing can well equal most of them. Even the common "Traveller's Joy" is one of the most remarkable and beautiful hardy climbers one can possess. I have often noticed the beauty of this old English plant as it

grows on the hedges by the wayside. The development of the stamens of the flower and its permanent character, together with the beautiful cotton-like feature connected with it, render it most conspicuous and well worthy of notice as almost a curiosity among plants. These feathery and persistent flowers may be cut from the plant when they are just beginning to develop, carried home, and placed in a vase without water or anything else, and they will continue to develop themselves for many days—in fact, until they have perfected all their fine feathery parts in a most beautiful and delicate manner. They may then be dyed all sorts of colours, when they will make charming ornaments for vases for many months.

The Clematis produces its flowers on the current year's wood—that is, the plant makes the growth on which the flowers come at one and the same time. All the ripened wood produces young growth at the joints on which come the flowers. Therefore, when the Clematis is pruned, cut it back to some well-ripened last year's growth containing live buds. The time for pruning is from February until May for the outdoor kinds; but for the indoor varieties, such as *Sieboldii* (a most beautiful greenhouse sort), *Indivisa*, &c., it may be done at any time during the winter, or as soon as the flowering is over. But for the hardy outdoor sorts it is not safe in some counties—*e.g.* for the northern counties—to prune till after the danger of frost is over, as sometimes severe and protracted frosts will kill them.

The Jasmine.

The *J. Officinale* is the most popular of this tribe, nor is there one of all the genus better suited for a climber or for pot culture. It requires a south wall and a warm and dry soil. In the western counties about Torquay it flowers profusely, and grows to a large size on the south walls. It will be observed that the Jasmine bears its flowers on the young wood of the current

year; that is, that which springs from the eyes or cut-back spurs of the old wood.

In the first instance, lay in the principal leaders as is done with a Rose trained on the wall. Then adopt these leaders as permanent bases for the future supply of laterals; each of the buds on these leaders will emit a lateral, and these will give flowers. Every season after the flowering is over, and at any time from November until March, cut these laterals back to one or two buds on the leader, *i.e.* spur them in as you would a Grape Vine.

Old leaders that are worn out, as well as weak ones, may be cut clean out, and new ones substituted for them. Frequently the old leaders will want shortening in to prevent the plant from getting barren below.

The Passion-flower.

As a rule Passion-flowers get the mastery of the gardener. It is a rare thing indeed to find the common *P. Cærulea* kept in good order—it is generally a mass of confusion. The reason is that this magnificent climber makes such rapid growth that it gets into a confused state before the manager is aware of it. The Passion-flower, and the person in whose care it is, remind one of the boy who was sent by the farmer into one of his fields to spread a lot of manure heaps over it. The boy idled away his time, and thought to himself that he could do the lot in one quarter of the time allowed him for the job, and so kept delaying and delaying until he found night coming on fast, when he gave it up and said it could not be done at all. Just so is it sometimes with the Passion-flower. Many, no doubt, think and say, "When I have done so and so, I will see to that Passion-flower on the verandah;" but a week is soon gone, and in the meantime it gets in such a confused state that it cannot be disentangled without a serious injury to the young and tender growth.

It must be observed that the Passion-flower produces

its flowers upon the current year's wood, *i.e.* it makes some considerable growth before they appear on the wood of the same season.

The proper treatment of it, as regards pruning, consists in first laying in permanent leaders, which should not be thicker or closer together than those of a Grape Vine. This is where most persons make mistakes: too many leaders are laid in, one permanent leader being enough to cover two feet on each side of it with laterals. At any time from February until April these laterals may be cut back, as in the case of the Grape Vine. And here I would just remind the reader, that the cutting back must never be omitted for a single season, for if it is, disorder and a loss of neatness will ensue, and, besides this, there will be no display of its curious and beautiful flowers. It must be carefully and constantly pruned once a year, and the laterals neatly laid in, if a really good display of flowers is to be expected.

The Wistaria.

There is no hardy climber more beautiful, nor one better suited for arches, pillars, and festoon work, than this plant. It grows very rapidly, and makes rods of ten or twelve feet in length in one season, and these rods are so flexible that they may be twined and trained at pleasure. The flowers are produced upon the last year's wood, consequently the pruning is quite different from that of the Passion-flower. Although long spurring must be adopted on old leaders year by year, yet the finest flowers, as well as the greatest number of them, are obtained from the last year's growth well ripened as in the cultivation of the Vine. To insure a fine display of flowers, lay in as much of the well-ripened wood as possible. The pruning of this plant may be done from November till March, but not much after.

The Bignonia.

The Bignonia, or *Tecoma*—for the division of this genus is not outwardly different, although there is some

difference in the internal construction of the seed vessel —is one both of grandeur and beauty. As a tribe they constitute plants fit for outdoor and indoor ornamentation, being of comparatively easy management; but, in spite of this, we seldom find them grown in our conservatories. *B. Alba* is a splendid conservatory sweet-scented plant. *B. Grandifolia* is another good climber, and grows rapidly, its flowers being of an orange and purple colour blended together. Then there is *B. Radicans*, sufficiently hardy to stand out of doors on a south wall.

These are magnificent specimens with their grand trumpet-shaped flowers of a large size, varying in colour from white to crimson. These flowers are produced upon the current season's wood, similar to those of the Grape Vine, the treatment of which as to the pruning will serve for an example.

The Climbing Bignonias should, in the first instance, have permanent leaders laid in as for the Vine, then these will give laterals on which come the flowers; and when the flowering season is over these laterals may be cut back to spurs. Care should be taken that the wood is well ripened, or but few or no flowers will be the result. Some thinning out will be necessary during the growing season to let the sun get at the young wood in order to ripen it thoroughly.

The Tacsonia.

The *Tacsonias* are a genus of the *Passiflora*, or a division of that genus. The flowers, which are produced on long pendulous footstalks, are showy and somewhat remarkable. The *Tacsonias* are conservatory plants of a quick growth and moderately free in the flower. The pruning may be assimilated to that of the Passion-flower.

The Aristolochia.

These are a genus of noble and beautiful-foliaged climbers, with curious, but, as a rule, insignificant

flowers. No one should get this climber with a view to the flowers; but for grandeur of foliage there are few things to match it.

It is necessary to prune them by cutting back as for the Vine, and in order to obtain abundant foliage if to cover a wall. They are much liable to insect pests.

The Rubus, or Double-flowering Bramble.

This is a climber but little grown or known, but still it is a good one. The foliage is like that of the common Bramble, but I think of a deeper and richer green. The flowers are similar to those of the finest Blackberry, but as double as a Rose; it is a beautiful thing when in flower. It requires a south or south-west wall, good soil, and to be pruned annually, cutting into spurs—not too close, however.

The best time to prune them is in March or April. There are a great many varieties of this tribe, but I more particularly refer to *R. Bellidiflorus*. There is a very pretty double pink-flowered variety, *Flore-roseo pleno*.

The Solanum.

There are a great number of this family, some being adapted to compact pot culture, and others for training on walls. However, I here refer to *Jasminifolium*, *Giganteum*, and *Arboreum*. These are usually classed with greenhouse plants, but in the West of England *Giganteum* and *Arboreum* do well on walls out of doors. *Giganteum* is a fine-foliaged climber, producing clusters of beautiful light blue flowers, making it a most desirable plant to cover trellises and walls; it will grow many feet in a single season.

The pruning of this plant consists in cutting back to spurs annually from February until April, or the old rods may be cut clean out and the last year's young wood laid in, from which an abundance of flowers will come. Some will require cutting quite down, in which case young stuff will come up; others require cutting quite back early in the spring, to induce an entirely

new growth, on which will come berries, but this applies to the fruiting kinds. The kinds named above grow fast, and are showy things for covering walls, arches, pillars, &c.

The Pyrus Japonica.

This can scarcely be called a climber, yet it is an excellent plant for training on low walls, trellises, &c. There is no necessity for me to describe it, as almost every one is acquainted with it. It is a very handsome as well as one of the hardiest and earliest flowering plants we possess. In spite of the cold it will flower in February and March, and before the leaves appear. There is nothing more striking than a *Pyrus Japonica* in full bloom on a south or south-east wall in the months of February or March, with its gorgeous scarlet flowers. It will grow in any good common garden soil, but it requires some annual pruning in a similar way to that adopted with the Pear or Plum; that is, spurring in, and laying in the young wood which bears the flowers.

To preserve a neat, orderly, and scientific appearance in the plant, it is necessary to prune it and train it handsomely, just as a gardener would do in the case of a Plum-tree bearing fruit. I am of opinion that the beauty of a trained tree is considerably enhanced by the training being done in a neat and scientific manner, let the plant be what it may.

In the first instance the *Pyrus Japonica* should be laid out on the wall or fence in a similar way to which a Peach would be done by a good gardener, and preserved on the same principle year by year. Old and barren plants may be cut quite back in order to induce the formation of a new tree. (See the "Pear," "Plum," "Peach," &c.)

The Pyracantha.

This is one of the evergreen Thorns, and though not a climber it may be trained to cover a high wall.

It will carry foliage from the lowest parts of the plant for many years, and maintain an equal distribution of the growth and leaf from its lowest parts up to the top, although it may be from twelve to fifteen feet in height. It is not a fast grower, but possesses a most tenacious power of endurance; no weather seems to affect it.

It is very striking in its appearance when in berry, which it bears in large clusters. These continue on the plant for many months, contrasting in a remarkable way with the foliage, which is of an intensely dark green, the berries being of a vermilion colour. It is a very desirable plant for walls where continued neatness and an evergreen covering are the objects in view, let the situation be what it may.

The pruning consists in merely an annual cutting off of foreright growth, *i.e.* the little growth it will make direct from the wall, and a laying in of the leaders and sub-leaders. Old plants may be renovated by cutting them back severely, and then strong young wood will be made in the following season.

The Calampelis Scabra.

This is the *Eccremocarpus* of some, and is a tribe belonging to the *Bignonias*. The flowers are small, but beautiful and of great substance. The plant bears its flowers in immense clusters, and continues to do so all through the summer in places favourable to its growth. It is a most rapid climber, and will grow to the height of ten or twelve feet during one season if the plant is strong at the root. It requires particular attention in pruning and training during the growing season, for if neglected for only a week or two the confusion of the tender growth will be irremediable.

Some thinning out of the young growth and careful training in of the remaining leaders and laterals cannot be dispensed with, without a great loss of beauty and good order in this climber. Young plants generally die down to the ground in the late autumn and

shoot up again in the spring, but in such cases some winter protection of the roots will be necessary. Cover them with a straw mat tilted so as to throw off the heavy rains. Old and woody plants may be trimmed by taking off all the sappy stuff. It is best to have a slight protection during frosts, but in the West of England the *Calampelis* will generally stand out all through the winter quite unprotected.

The Cobœa Scandens.

This is a most rapid and noble climber, and may be used for outdoor purposes in summer; but as a rule it is only fit for cool conservatory decoration. The plant is a fine one as regards its foliage, and the flowers are like a bell in shape, being of a rosy purple colour. It flowers freely when the plant gets two or three years old. The *Cobœa* will live for many years, and thrive and flower abundantly. I knew of a plant that had a stem—the main one—as large as a man's thumb, and it was then splendidly in flower.

This plant may be raised from seed or by cuttings, and the pruning of it consists in cutting back the last season's growth to a joint on the main leaders. This should be done in the spring, from February until April, but not in the autumn nor in the dead of winter.

The Ceanothus.

C. Azureus, or *C. Cæruleus*, is generally considered of a half-hardy nature; but it grows splendidly on open walls in the West of England. It is a most beautiful plant for compactly covering the walls of a house. All the pruning required is to cut out any superfluous parts and to thickly train in the young growth.

The Kennedya.

These are all more or less beautiful greenhouse climbers, having pea-shaped flowers. Some are poor

in colour; but *K. Lindleyana* and *Makoyana* are beautiful purple-flowered varieties. However, some of the reds are, in my estimation, of too dirty a colour. The blue and white flowered kinds are beautiful ornaments for the conservatory, and may be grown in pots, trained on globular trellises, or up the pillars, or on the back of the house. In any case due attention must be paid to the thinning out and keeping the plants open, so as to get all the air and sunshine possible into them, in order to ripen the wood. They flower on the laterals which spring from well-ripened wood. The pruning consists of shortening in these laterals every autumn, in order to obtain good flowers the ensuing season.

The Stephanotis.

This is a very limited genus, containing but one or two varieties, *S. Floribunda* being the only one worth growing; although I believe there are two varieties of this, one of them being a shy flowerer. It is a stone climber, with thick leathery ovate leaves something like those of the Laurel, though not so large. It is a great favourite with those persons who cultivate cut flowers.

The flowers are white, and are produced freely upon the well-ripened wood; that is, if the growth is well ripened during the previous season, it will produce laterals which will give an abundance of flowers.

The pruning consists in cutting away the worn-out wood, and training in the well-ripened young wood, carefully thinning out the whole plant so as to admit a full share of the sunshine and plenty of light, or no flowers must be looked for. The time for pruning is as soon as the wood is thoroughly ripened, which is generally in the autumn. It is useless trying to grow the *Stephanotis* for flowers in a dark, shady, or dirty house, or one not dry and warm. Neither must it be grown where trees shade the house, as is sometimes the case. Sunshine, good light, and a warm, healthy climate are indispensable for growing the *Stephanotis*

successfully, for it must be remembered that it comes from the East Indies, where Melons will grow among the stones in the streets.

The Abutilon.

This is a most beautiful class of fast-growing plants, being neither climbers nor twiners, but they may be utilised as such in various places. At the back of a conservatory the *Abutilon* is quite at home. It is most ample in its foliage, this being of a fine feature also. It flowers freely on all the young wood. Age is necessary for an abundance of these when it is grown as a pot plant.

In pruning the *Abutilon* spur in the laterals to a few buds, or cut out old limbs and lay in moderately well-ripened young wood. This may be done annually at any time in the autumn, or if the plant is out of doors prune it in the spring.

The Sollya.

This is a small family of very pretty dwarf, blue-flowered climbers, fit for training on the back trellis of a conservatory or up the pillars of it. In the first instance induce the plants to grow strong, and then select one or two of the main leaders to twine round the pillar. Prune all the laterals produced on these to a few buds on each spur, and continue to do so annually. Do the same also by a plant trained on a trellis on the back of the house or elsewhere. By this method of treatment an abundance of the pretty little blue, salver-shaped flowers will be produced, forming quite a display for many weeks, and, indeed, for most of the summer.

The Plumbago Capensis.

This is not, strictly speaking, a climber, but it may still be utilised as one for conservatory decoration, and is a most beautiful thing when trained in that way.

Some put this plant down as growing two feet or so; but I have found it difficult to keep it so dwarfed. Even in a pot it will grow three feet easily; but if it is planted in a compost of equal parts of maiden loam and good peat, at the foot of a pillar or the conservatory wall, it may be trained to almost any reasonable height by degrees, by growing it freely and inducing it to give laterals, which will produce the flowers.

It is a woody-growing plant, and if well managed by shortening the laterals moderately after the flowering is over, it will continue for years as a good ornament for a conservatory, making a fine display of its beautiful light blue heads of flower, which will continue for a long time. It is the best of this genus, and is not difficult to grow.

The Ipomœa Learii, Etc.

I. Learii, reddish purple; *I. Horsfalliæ*, rosy purple; both of which are rapid-growing climbers fit for the roofs of conservatories. They are generally classed as stove plants, but I have grown *Learii* in a common greenhouse. They should be trained a foot or more from the glass, where they will make a most splendid display. It is necessary to keep them constantly cut back, as they run to growth towards the extremities.

The Escallonia Macrantha.

This is not really a climber, but a fast-growing plant that may be advantageously utilised as one. I have written on this in another part of this work, treating it as a shrub; but as a beautiful evergreen flowering plant for nailing on walls or training on trellis-work it has no equal.

It is necessary to train out the leaders first, and then to lay in the laterals, filling up the spaces between them so as to completely cover the wall or trellis, which it is easy to do. It will be necessary in the spring of every year, in the month of March or April,

to shorten these laterals by cutting them in moderately close. Then a new annual growth will be made, producing an abundance of flowers throughout the summer. I cannot convey any adequate idea to the reader of the beauty and richness of a well-managed *Escallonia Macrantha* trained thus on a wall, facing the south or south-west, if he should happen to have no knowledge of this plant.

The Lapageria.

There are at present but two varieties of this beautiful climber—one a rose-coloured flower and the other a pure white. Both of these are admirable plants for trellis-work in the conservatory. They grow freely and flower profusely. The flowers are bell-shaped, and are suspended from the laterals in a beautiful manner, hanging below the foliage.

This plant should be trained so as to give the flowers the advantage of a free suspension, and the kind of trellis on which to train it should, no doubt, be one of a cylindrical shape, having tiers on tiers of wire, each one sufficiently far apart to admit of the flowers swinging clear of the one underneath ; and they should also be trained all round. The flowers are produced on the long laterals, which must be tied to the leader. The pruning consists in cutting these laterals back after the flowering is over.

The Habrothamnus.

These are an extraordinary kind of flowering greenhouse plants, *H. Fasciculatus* being one of the most profuse in that respect. The flowers are of a crimson colour, and grow in immense clusters on the ends of the laterals. The pruning consists in an annual cutting-in after the flowering is over, shortening in those laterals and cutting back the old growth, so as to induce a new growth throughout the whole plant.

The Hoya.

This is a stove climber of moderate growth. It likes warmth, but it may be grown in a good warm greenhouse and trained on a wire on the back wall. It is a very rich-foliaged plant, which it carries continuously for years. It may be kept in good order with very little trouble, although some slight pruning will be necessary to keep the plant back.

The Cotoneaster.

C. microphylla is the one generally grown, and is a useful plant for covering low walls and fences. It is so hardy that neither situation nor climate will affect it. A little thinning out and an occasional cutting out may be necessary. When it is grafted on stems, as is often done, for lawn trees, some free growth and thinning out will be needed.

Finally, as regards this part of the subject, all creepers and climbers, whether of a hardy or tender nature, which flower upon the current year's growth, laterals, &c., should be pruned annually, as is usual with the Grape Vine—cutting back the laterals to within a few buds of their base, but, as a rule, not too close. I want the young gardener, and also the amateur lady and gentleman gardener, to observe this rule as a safe guide in pruning climbers in general. Of course leaders are to be laid in as an extension in all cases.

PART V.

THE PRUNING AND RENOVATION OF POT PLANTS AND SHRUBS.

The Epacris.

These are very similar to the Heath, but more hardy, by which I mean that as greenhouse plants they will endure rougher usage than the greenhouse Heaths. The *Epacrises* are a fast-growing class which soon form large specimens from small plants. Generally they may be grown with a miscellaneous collection of greenhouse plants, and are of great use as cut flowers from the autumn till late in the spring.

As soon as the flowering is over the plants should be cut back moderately and stimulated into active growth, and when two or three inches of new growth are made nip out the top of each shoot; this will induce several laterals to push out from each leader so stopped. These laterals may be stopped as soon as they are two inches long. The nipping out of the points of these young shoots may be repeated three or four times, but not carried too far, or else no flowers will be produced. Judging from the time the variety comes into flower, a certain period must be allowed for it to make six or twelve inches of growth from the last stopping, and to mature that growth; for instance, if it is an autumn-flowering sort, the nipping out of the points of last-made laterals must be discontinued in June or July at the latest, and the growth stimulated by means of a moderate heat and some liquid manure,

and when from six to ten inches of good growth are made the plants may be exposed to a full share of sunshine in a good house not shaded, plenty of air being admitted daily to ripen and harden the new parts. Thus it will be seen that three or four months should be allowed for the new growth to develop itself and to ripen from the last stopping of the laterals.

The Camellia.

Generally Camellias are considered to be impatient of the knife; hence we find them with stems six or eight feet high without a single branch, whilst growers of them have to build the houses high, and to continue raising the same building according to the demand of the plants. This, however, may be avoided by pruning, but of course a little sacrifice of flower for one year is necessary, and this is not felt where there is a large stock of plants, or it may be even only a few. I once had some Camellias that were getting barren below. I cut some of them back severely, in fact to mere stumps, put them into a nice heat, gave stimulants, and they broke out strong, and made finer and healthier plants than some which I did not cut back. It would not be safe to allow Camellias to run up to ten feet with a clean stem, and then to cut them down to the ground, but I maintain that they may be kept dwarf by cutting them back before they get to such a state of growth.

The proper time to prune the Camellia is in the spring, after the flowering is over; some, in fact most people, are afraid to cut them at all, but let me give such persons confidence by assuring them that what I say is not mere theory, but the result of practical experience. Do not be afraid to cut back overgrown Camellias. As soon as they are cut back give them a few weeks' moist heat, *i.e.* close the house and syringe the plants every morning, and continue them in a growing state till the terminal buds are formed, then harden off a little and set them out of doors if in pots, but if in the beds of the house open the lights all round day and night until

November. Old Camellias may be renovated by severely cutting back, almost to mere stumps.

The Oleander.

The *Oleander* is an old favourite and of a very enduring constitution. It will live and grow under all kinds of treatment, but it requires an abundance of water and some heat in order to produce good flowers. There are few flowering shrubs more beautiful than the *Oleander*, and I scarcely need describe it, as it is so well known; suffice it to say, then, that the flowers are of a red, white, or pink colour, and are comparable to some Roses, the single kind being similar to a self-grown Carnation.

These plants flower in clusters, which are extremely beautiful. They require some annual pruning by severely cutting back the leading shoots and reserving the lower laterals. This should be done immediately after the flowering is over, which is about June, July, or August, according to treatment. After the plant is cut back shift it, give an abundance of water, and subject it to a moist heat of 65° or 70° Fahr. to induce a fresh growth, and when this is well developed discontinue the heat for a few months till the flowering comes on again. The *Oleander* will bear any amount of cutting back.

The Acacia.

The greenhouse Acacias are both numerous and beautiful ornamental shrubs, many of them being splendid-foliaged plants, *A. Lophantha* being among the best. This class requires annual pruning to prevent it getting beyond what is desirable. It is of a very free growth and soon gets large. Nipping out the points of the young shoots as the plant proceeds in growth is necessary from the first stages of its growth as a young plant, and to keep it dwarf it should be frequently cut back. It will bear the knife well.

The pruning should be done in the early spring, so as

to allow of new growth being made and matured or fully developed before the winter. Plenty of water must be given the plant during the summer. This is one of our best window plants.

A. Armata is a very handsome dwarf shrub, and one which is well known. The pruning of this evergreen shrub consists in the occasional cutting back of old and large plants, and no one need be afraid to cut them back severely. This should be done immediately after the flowering, and the plant should be stimulated afterwards by means of some weak liquid manure, being kept in the greenhouse till six inches of new growth are made, when it may be set out of doors under a north wall for a few weeks until there is no danger of frost. Young plants should be stopped in the leaders by frequently nipping out the points, which will induce a compact and handsome growth.

The Chorozema.

There are several varieties of this beautiful flowering greenhouse shrub, all of them being fit for fine specimens in any good common greenhouse. They are not difficult to grow, as they do not actually require a high temperature. In fact, they will not bear it. No more handsome plants are grown than these when in full flower. To form fine and symmetrical plants of the *Chorozema*, early and frequent stopping of the leaders must be done while they are young, to induce them to branch out equally all round. It is the formation of the future specimen in the young plant that is of the greatest importance.

Grow the Chorozema as fast as you can, and stop the leaders as often as they have made two or three inches of new wood. Old and large plants that have been neglected and have got out of order, but are still healthy, may be carefully cut back pretty severely so long as there is a good stock of young wood below. By this means an old plant may be renovated.

The Orange-tree.

As a rule, Orange-trees will grow moderately well in form without much trouble, but when they are young some precaution will be necessary to prevent the plants getting deficient of branches below. The French people are very clever as gardeners in growing the Orange in a handsome and dwarf manner, bearing fine fruit on very dwarf and small plants. I have seen them, and have also had them with full-sized fruit on plants not more than eighteen inches high from the pot.

While the plants are young and growing fast nip out the points of the main shoots; this will induce a bushy and dwarf growth. During the summer an abundance of water must be given these plants, with a weekly watering of strong liquid manure.

Old Orange plants may be cut back occasionally to prevent them from getting overgrown. The best time to do this is early in the spring.

The Leucopogon.

This is a scarce though remarkably beautiful greenhouse flowering shrub of a dwarf habit. It is a woody plant of free growth, and flowers well during the early spring, producing an abundance of small spikes of diminutive wax-like white flowers, very delicate and beautiful, being well adapted for bouquets and for ladies' head-dresses.

The management of this plant consists in a constant stopping of the leading shoots while they are young to induce a dwarf growth, and for foliage close to the pot. Old plants may be cut back moderately, so as to reserve the young wood below.

The Pimelea.

P. Spectabilis is about the best of this tribe. It flowers freely, and has a very neat and good appearance. It is not at all difficult to grow, so that no greenhouse should be without it, the flowers being good for bouquets.

While the plants are young, nipping out the points of the leading shoots is necessary to induce a full-developed plant below. It is needful to continue this nipping out in order to keep the plant well feathered with leaf and young wood below, for on the points of all fully matured young wood come the flowers.

The pruning of the *Pimelea* consists in cutting back all the growth that has borne flowers, pretty close to the base of the young wood, as soon as the flowering is over. Then thin out a little and stimulate the plant to give vigorous growth, and stop the leaders once or twice afterwards; then get a moderate growth and discontinue the stopping for the season, *i.e.* discontinue it after August.

The Inga.

There are many varieties of this tribe, but *I. Harrisii* is a very showy and peculiar plant. Its flowers are like a flower all stamens, but displaying themselves most gorgeously by expansion. They are rose-coloured, but lighter in the centre. It is a cool stove plant, and easy to grow, requiring only a low temperature during the winter. It grows freely and produces its flowers on the ripened wood of the previous year, similar to the *Acacia Armata*.

The pruning of this winter flowering plant consists in the cutting back as soon as the flowering is over, and then getting as much young wood on the plant through the summer as possible, which should then be well ripened before the winter.

There are other good varieties of this genus, mostly natives of the West Indies and South America.

The Euphorbia.

E. Jacquiniflora is about the best of this class, although *E. Fulgens, Splendens,* and *Punicea* are much alike; and probably the first-named one is *Fulgens,* or *Splendens,* so that I will select *Jacquiniflora* for my observations.

This is a very showy and free-flowering variety, having bright scarlet flowers. It will grow to a large size in a warm greenhouse, but the plant requires stopping while young to induce a branching habit, and the leaders also require frequent stopping. In doing this there is some danger of the plant bleeding, therefore when it is cut a lighted lamp supplied with benzoline should be kept close at hand, and the moment it is done some red sealing-wax should be immediately placed on the cut quite hot, holding the lamp and wax close to the cut, in which case the danger of bleeding will be avoided.

The Fuchsia.

I have not much occasion to say anything here about the Fuchsia, for, as a rule, the habits and culture of this genus are well known ; but as there are exceptions to every rule, so it happens in reference to this plant. And here, for the better information of any reader who cannot correctly spell the word *Fuchsia*, I beg to refer to its origin. The name is derived from that of the man who either found it and introduced it from seed or otherwise. *Fuchs* was his name, and the "ia" was added just as we now attach two i's to a seedling of any new plant, or to one newly found.

Fuchsia fulgens, minor and major, are certainly a distinct species, although the word *fulgens* applied no doubt originally to the whole genus, as it refers to the colour, which means "shining red," that being the colour of the variety first introduced. Some say that *fulgens* refers to the disposition of the flower, but as a rule it means shining or glowing, scarlet or red, which, as I have already said, was the original colour of the Fuchsia. They are a very beautiful species. *F. Major* is one of the grandest flowering species of this genus, and when grown to a standard with a clean stem of six feet, and the plant induced to form a good head from which numerous corymbs of flowers are suspended, it forms a fine floral object. It is necessary to form a good symmetrical head of say six or seven main

branches, then to keep these as a sort of framework from which laterals are emitted on which will come the flowers in the autumn. As soon as these laterals have done flowering, or during the winter, spur them in to a bud or two.

Old Fuchsias should be cut back to the base of the laterals which spring from the main leader during the winter or in the early spring, and induced to make a vigorous growth from these spurs. In most cases two or three year old plants will make as fine flowering specimens as one year old plants.

The Geranium.

There are three or four distinct classes of the Geranium. There is what is called the "Fancy," the "Zonal," the "Bicolor," and the "Tricolor." The first are the general favourites, but the second are beautiful specimens for cutting for bouquets and for bedding; while the last-named are among the most striking and peculiar in the genus.

Now each of these divisions requires a somewhat different management in regard to the cutting of them. The Fancy kind must be cut back annually after flowering, let that be when it may; *i.e.* if this has taken place early and flowers are wanted in the following year, cut them back as soon as the flowering is over. This cutting back, or cutting down as some call it, consists in doing so as far as the base of the last growth, leaving a good bud at the base on which dependence may be placed for a strong shoot as the basis of a good plant for the next year. As soon as these have made an inch and a half of young growth nip out each point. This will induce several laterals to issue on the base of it, and each of these may be stopped again as soon as they get two inches long.

The stopping or nipping out of the young growth must be discontinued fully two months before they are required to flower, or even more. The stopping or nipping out of the leaders retards the flowering season;

but as *Pelargoniums* cannot be made dwarf, and a well-feathered plant below cannot be had without this nipping out of the main shoots, some of it must be done.

The same kind of routine is necessary for the Zonals and Common Scarlets for pot work, although there is not half the difficulty attending these as there is with the "fancy" kind, nor is there, perhaps, quite so much stopping required with old plants as with young ones.

As regards the "Bicolors" and "Tricolors," a somewhat different plan must be adopted. Very old and strong plants of the Tricolor class may be cut back pretty freely if they can be subjected to a moderate heat afterwards, or else only a very moderate cutting back must be done. The safest and best plan to adopt with them is to commence, while the plants are young, to nip the points out and grow them in a good heat with a weekly watering of weak liquid manure.

The climbing ivy-leaved sort requires a different kind of management still; these must either be trained on the trellis, or up the pillars of the house, or on trellises in pots. In any case, some cutting back of the chief leaders must be resorted to occasionally, to prevent the plants getting barren of leaf and flowers below.

The Gardenia.

The pruning of the *Gardenia* may be assimilated to that of the Camellia, for both of them bear their flowers upon the preceding year's growth, consequently whatever cutting back and pruning are required must be done immediately after the flowering is over. Cutting back is necessary to prevent the plants getting barren of foliage below; but in doing this, care should be taken to cut to some laterals, and these will give out sub-laterals which will fill up the plants with flower-buds in abundance.

The *Gardenia* is an especial favourite with the ladies, but the time is past when a guinea must be given for a single flower bud, for the growers of them have found out how to get these flowers at any time and in such

abundance that a shilling is reckoned a good price for one now. In the United States of America the hedges are frequently composed of *Gardenias*.

The Andromeda.

The *Andromedas*, like the Heaths, produce their flowers upon the matured wood of the preceding year, or the matured young growth of the current year; therefore the cutting back must be done immediately after the flowering is over, and the plants must then be encouraged to make new growth for the ensuing season.

The Andromeda is a beautiful class of free flowering shrubs. Some are dwarf, free flowering and hardy, such as *A. Floribunda*. Some are handsome greenhouse shrubs, as *A. Phillyreæfolia*—a beautiful variety producing pure white flowers on a very dark green foliage which gives it quite a charming appearance. It should be in the possession of every lover of what is good in floriculture; and there is no plant better suited for cutting.

The Ixora.

The *Ixoras* are a wonderful class of flowering shrubs, producing amazing heads of flowers. They embrace many shades of colour, some being of a pure white, others deep red, whilst others are of an intermediate shade. They are all stove shrubs with an evergreen foliage. They produce their flowers upon the current season's growth, forming a terminal head of flower, therefore all cutting in and pruning must be done as soon as the flowering is over, otherwise the flower-buds will be cut off if this is deferred till long after the new growth is made.

The Leschenaultia.

These are a beautiful class of New Holland plants, of free flower and dwarf habit, and are of remarkably

easy culture. No greenhouse should be without one or two of these, well trained over an eight or nine inch pot. When I say "trained," I mean that the plants should be constantly stopped while they are young, to induce them to grow equally on all sides, so as to make a symmetrical and full specimen, covering the top of the pot and hanging a few inches over the rim, and not, as we generally see them, growing on one side only, and without shape or form. There is nothing among greenhouse plants capable of exciting more interest than a well-grown *Leschenaultia* when in full flower.

Particular attention must be paid to the stopping or nipping out of the points of the leaders while the plants are young. I repeat this, because it is the only remedy against a plant growing one-sided and thin over the top of the pot. Young plants of a good description may be had of the nurserymen for from 1s. 6d. to 2s. 6d. each.

The Lantana.

These are a very showy class of greenhouse plants, and are useful for bedding purposes. The plants must be frequently stopped while young to induce a dwarf habit.

The Siphocampylus.

These are a splendid class of stove or warm greenhouse flowering half woody and half succulent plants, of a tender nature and of free growth. They have also fine foliage, and are conspicuous objects, well deserving of especial culture. They are very much like *Salvia Fulgens*, except that the flowers are longer and more beautiful. I refer more particularly to *S. Coccineus* and *S. Lantanifolius*, two old but handsome varieties. They should be cut back as soon as they have done flowering.

The Justicia.

These are a conspicuous and beautiful class of flowering greenhouse shrubs. They should be pruned as

soon as they have done flowering, and the plants induced to make a moderately strong new growth afterwards, without applying strong stimulants in the shape of liquid manure, as this would produce too strong a growth in some of the free-growing sorts, such as *Coccinea.*

The Kalosanthes.

The *Crassula* of some, which means a plant with a "thick leaf." It is a thick-leaved greenhouse succulent plant, of great beauty when in flower. *Kalosanthes Coccinea,* or *Perfilata Miniata* of some, is a superb plant. Some little attention is necessary with this when it is young, in order to obtain a fine and symmetrical specimen. I have had it as large as two feet in diameter and as much in height, symmetrically grown, and full of fine flowers; but if it is not duly attended to when young, or even when it has become an old plant, it will grow very awkward and never make a handsome plant.

The cutting from which a well-formed specimen may be expected must be a short one; and when it has struck, stop it, so as to induce an equal branching out on all sides. Then tie these laterals out to sticks, so as to form a symmetrical plant. Continue these as a permanent framework, and induce them to branch out again, so as to fill up the body of it. As soon as it has down flowering, cut the laterals back to an inch of their base, and subject the plant to a little warmth to induce it to break well, then keep it cool and dry.

Old plants may be cut back pretty severely, but occasionally some difficulty is experienced in getting an even and healthy growth from very old ones that have been neglected. Saving these few difficulties, the *Kalosanthes* may be grown by any one.

The Cactus.

The *Epiphyllum* and *Cereus* classes of this genus may require some occasional pruning, such as cutting

back old worn-out parts that have done flowering to make room for the new ones. This will be necessary in order to maintain a sufficiently thin plant, so that the parts may thoroughly ripen, and to make room for the proper development of the flowers.

The Coleus.

I need not give any long description with reference to the Coleus, as every one must be acquainted with its handsome appearance and its fine foliage. Nevertheless, it is useless for any one to attempt to grow these plants through the winter if they cannot place them in a warm glasshouse, where a heat may be maintained at 65° or from that to 70° Fahr. They are remarkably handsome bedding plants, and there is nothing to excel the various kinds of the Coleus as fine pot plants for the conservatory or for table decoration. They will grow with ease to large specimens in the course of one season. One precaution is, however, very necessary, and that is, for those who may happen to begin to grow them, and who wish to obtain handsome plants, to commence nipping out the points of every lateral springing from the main leader as soon as they have grown four inches long, or have made two leaflets, reserving the second leaflet. These will then each give a sublateral, and these again must be stopped, and continue to do so until a well-developed plant is formed. Old plants may be cut back severely, and subjected to a good heat, when they will form extra fine specimens.

The Petunia.

The conspicuous and beautiful double and variegated flowers in this class render it a general favourite. The Petunia has of late years gained a reputation which it is not likely to lose, and as a pot plant it stands remarkably well.

While the plants are young particular attention must be paid to the nipping out of the points of every

young shoot made, to prevent them from becoming thin and lank specimens. The Petunia does not require much heat at any time; to the fact that too much is given, and want of sufficient light, may be attributed the poor plants we often see. A good light, a temperature as cool as is consistent with safety and the promotion of a healthy growth, good pot and house room, with constant stopping of the shoots, must necessarily result in fine specimens of a superb class of ornamental plants not to be surpassed.

The Calceolaria.

There are two classes of the Calceolaria, as most people know, and each of these requires different management. The Shrubby Calceolaria must be constantly stopped, to get a dwarf and handsome specimen as a pot plant. This nipping out of the points of the shoots may be continued as long as you please, for the Shrubby kinds will flower under almost any circumstances; but, as a rule, the stopping may be discontinued in May, when the early autumn-struck plant should have arrived at a fair size, and be of a symmetrical character, so as to produce a fine bold flowering specimen through the following summer for a vase or a pot.

Old and healthy plants may be cut back moderately, and kept for two or three years for vase or pot work.

The Herbaceous varieties must never be stopped, or the plants will be spoilt; nor must the Cineraria ever be stopped under any circumstances.

The Chrysanthemum.

No one can obtain a fine specimen of the Chrysanthemum unless a constant nipping out of the points of the leaders in the first instance is done; and, in the second place, every lateral must be regularly nipped out as soon as it has made two inches of growth. This practice must be absolutely followed as long as it is practicable, which may be until the middle or end of

July, when it should be discontinued. It is necessary to do this to induce a handsome and dwarf habit, and also to get a full plant in a pot. At no time must the Chrysanthemum be allowed to suffer either from water or from a want of it, otherwise the foliage will suffer below, or it will altogether fail.

The Polygala.

P. Dalmaisiana is a pretty growing and a handsome flowering variety, and is well worth a place in every conservatory, on account of its freedom in flowering and the value of its flowers for bouquets and vases. It bears these on the current year's wood, *i.e.* a bunch of flowers comes on every few inches of new growth as the new shoots are made through the season.

Young plants should be frequently stopped, and old plants may be cut back pretty close and new growth made. If the early stopping of the leaders and first laterals are not well attended to, no one can obtain a dwarf, full, and handsome specimen.

The Corrœa.

These are all beautiful evergreen greenhouse flowering shrubs of a moderate growth, with handsome flowers of the shape *Cuphea Platycentra*, only larger; moreover, they are not of the same order. I merely mention this as a comparison, that those persons who may not know the Corrœa may form some idea of it. If I were to use the type of the natural order for this genus, which is the Rue, no one would see much resemblance in the Rue flower to that of the Corrœa. The latter bears its flowers upon the wood of the previous season's growth; therefore when it requires pruning it must be done immediately after the flowering is over, and a new growth induced at once by stimulants, heat, and liquid manure.

The Genista.

I have referred to this genus under the general head of "Hardy Shrubs," but have not, I think, included the one I am about to speak of as a pot plant. *G. Canariensis* is one of our earliest and best spring greenhouse plants. It produces its flowers in abundance upon the ripened young wood. In cutting back or in pruning this lovely shrub, let it be done as soon as the flowering is over, and then induce a free growth through the summer, frequently nipping out the points of the leading shoots.

Old plants may be severely cut back and a new growth induced by stimulants, and in this way an old plant may be renovated. For those who do not object to the yellow colour, there is no plant grown which is better adapted for early cut flowers than this.

The Mitraria.

Mitraria Coccinea is a fine greenhouse shrub which I am convinced is hardy enough to be grown out of doors in our western counties, especially about Torquay, Exmouth, &c. It is a handsome flowering shrub, bearing an abundance of *gesneraceous* flowers of a peculiar and pendant character. If it is kept thin by pruning and induced to make a good growth annually, I know of no plant that will produce a more singular and unique effect than this when set upon a pot turned up—an inverted eight-inch one will do—set on it so as to elevate the plant. This will give it the advantage of showing its character when in bloom, the flowers being suspended from the branches on long foot-stalks, which give the whole thing a very good effect.

The flowers are produced upon the current season's growth, therefore the cutting back or the thinning of the branches should be done soon after the chief bulk of the flowering is over.

The Shrubby Begonia.

There are a number of these, all being very desirable, warm, greenhouse or stove plants. All the Begonias may be grown in the common greenhouse through the summer months without any trouble, but none of them will do well in such a place through the winter without a moderate heat. They are beautiful things as a genus, but *B. Fuchsiodes*, *B. Chelsonii*, *B. Chambersii*, are among our best. *Chelsonii* is a splendid thing, but requires some attention in the stopping of the leader shoots to induce a neat and compact habit.

Begonias like a little shade as a rule, but if too much is given to *Chelsonii* it will become drawn and get thin. All the Shrubby Begonias must have the knife used to them pretty freely while they are young, to prevent them from growing too much at the extremities, and also to keep them dwarf and compact. The cutting back, however, must be done only during the early part of the growing season.

The Datura.

The Daturas are a noble, and some are even a splendid race of plants, but *D. Arborea* may be considered the best. This variety, as the word implies, is of a woody, tree-like nature, although it is a greenhouse shrub. This term applies to several varieties, but I now refer to *Floribunda*, a sort that is frequently grown on trellises in the greenhouse, and which blooms freely, producing beautiful horn-shaped, golden yellow flowers of a large size, measuring as much as five or six inches in length and an inch and a half in diameter; and even a small plant will flower when a few months old from the cutting, which latter will strike freely.

The annual varieties are all more or less noble plants, but the one I here allude to has no rival. It flowers upon the current season's young growth, consequently the pruning of the plant must be done soon after the flowering is over, or at least before it begins to make

growth for the ensuing season. In the first instance, some main leaders should be trained out to form a permanent nucleus from which laterals will spring, to be spurred back, as for the Vine, year by year; these will give an abundance of flowers annually. It is necessary either that the plant should have a little dry warmth through the winter, or that it be kept moderately dry through the dull winter months. It is not particularly tender, but will not stand the frost.

The Aloysia Citriodora.

As a pot plant this is not very beautiful, but is useful, and a general favourite on account of its agreeable odour, which is given out on pressure. It may be grown out of doors against walls, and will stand through the ordinary winter; the chances are but very poor in severe winters for this plant, and I have no doubt but that every plant of this kind, both large and small, has been wholly destroyed this severe winter (1879) all through the country, let the situation be what it might, outside glass.

This old favourite may be grown easily, and if it is well nipped in while the plant is quite young it may be made considerably more attractive as a pot plant than is generally to be found.

Old and deteriorated plants may be cut back close and encouraged to grow freely, being stimulated by means of heat and liquid manure. It requires some annual pruning in all its stages to induce a compact and symmetrical habit.

The Coronilla.

As a pot plant the Coronilla has few equals. It is almost a perpetual flowerer, and with its coronated heads of flower and pleasing green leaf it is a very general favourite. To grow this in a compact and handsome manner the leaders must be nipped in while the plant is young. Old plants may be cut back

severely, and they will break into new growth and form entirely new ones. The cutting back should be done in the early spring.

The Eutaxia Myrtifolia.

A genus with pea-shaped flowers of great beauty, which, however, chiefly depend upon the management of the plant. The plant should have especial attention given to it by stopping the leader shoots during the summer season, so as to induce a close and compact growth, when it will flower most profusely during the following spring.

The Heliotrope.

"Cherry-pie," as it is commonly called, is a most useful plant, both as a pot plant and for training on the back walls of the stove or warm greenhouse. Too much cannot be said in praise of this genus, but as it is so well known not much comment is needed. The Heliotrope generally is a straggling grower, and requires particular attention to the nipping out of the points of the leading shoots constantly, to induce a compact and full plant. Old plants may be cut in as you would prune a Rose, after which heat may be given them, and they will break into new growth freely.

The Veronica.

The Veronica will grow freely out of doors in the western counties of England—at least most of them will —but not in the northern counties. The half-hardy varieties, such as *Andersoni Variegata*, a beautiful striped-leaved kind, will not endure the cold of the north of England.

All the shrubby class require the constant nipping out of the leader shoots while the plants are young, to induce a compact and dwarf habit. Old plants may be cut back severely to renovate them and to get a new

growth. I often see old Veronicas that might be made new and handsome plants by cutting them in severely. The pruning should be done in March or April.

The Boronia.

These are a genus of fine flowering greenhouse shrubs which will make a good display in the spring. Nipping back should be done in the summer after the flowering is over. These are desirable plants for cut flowers and for conservatory decoration.

The Bouvardia.

All the tribe of Bouvardias are useful and beautiful—what may be called dwarf shrubs—some of them being especially so. The flowers are above the common standard as regards their delicacy and chasteness of character, and are remarkably well adapted for ladies' hair ornamentation. They are generally known and grown for this purpose, and they will attain to a fair size by proper management, otherwise they are but poor things.

By the use of proper soils (peat, maiden loam, leaf-mould, and sand) and a good even heat from a stove they may be grown to a fair size, having a clean stem, and being crowned with a fine head. The stem will become woody, and may be maintained as such, and the branches cut in during the autumn, from which floral branches will issue annually, producing an abundance of flowers throughout the winter months or in the spring, according to treatment.

The Mignonette.

Some will, perhaps, wonder that Mignonette should be included in a work on pruning; but I know of scarcely any flowering pot plant that requires more attention to thumb-and-finger pruning than the Mignonette, with a view to ultimately obtaining a good speci-

men. Let any one try to get a pot of good Mignonette without a constant nipping out of the leaders, and a short time will soon prove how futile is the effort, however good all the remainder of the treatment may be, soil and situation included.

As soon as the plants have grown two inches above the soil nip out the point, and do so again as soon as every lateral has made two inches of growth. Continue to do so till you are satisfied that the framework for a good, full, and symmetrical specimen is formed.

The Jacobœa.

Here is another plant that can never be made a handsome specimen unless due attention is paid to the thinning and the nipping out of the leaders; then I scarcely know of a more beautiful specimen for the greenhouse than the double crimson and double purple kinds. As soon as the plants are two or three inches in height, nip out the points of the leaders, and do the same with the laterals till a symmetrical plant is formed.

The Schizanthus.

These are annuals, but *S. Retusus* is no doubt one of the finest pot plants imaginable when sown in August, and grown as a greenhouse plant through the winter. The seed should be sown in the pot in which it is to flower, or if sown in five-inch pots, thinning out all the seedlings but one in the middle will be necessary. Then it must be shifted as soon as the roots fill the pot into a seven or eight inch pot, in which it should flower. While the plants are young, and through the winter until February, continue to nip out the points of the leaders and leading laterals. Then a full and handsome specimen will be formed, which, when in flower (which it will be by March or April), will be excelled by no other plant as regards its beauty.

The Violet, Viola, and Pansy.

All these should be cut over, as we call it, once a year, to maintain compactness of character as well as to strengthen the plants. There are many amateurs who do not understand the professional way of annually propagating these flowers, or else they do not care to take the trouble to do so, and who thereby lose their stocks, which otherwise they might save. The plainest and easiest method is to cut all the old rambling growth clean off from each plant.

The Violet should have all the stuff cut clean from it during the summer, say from May until August, so that each plant may have time to re-feather itself with foliage before the winter.

The Viola may be treated in the same way in the spring; and the Pansy should be done in the same manner in September, and then be top-dressed.

Unless these flowering plants are cut over once a year, or are professionally propagated annually, they will soon wear out and be of no value whatever.

The Wallflower and Antirrhinum.

Double Wallflowers and Antirrhinums should be cut back once a year to prevent them getting barren below, and this applies especially to the Wallflower. The cutting back should be done as soon as the flowering is over. Many persons do not like to do this, but it must be done year by year, and then there will be no loss, either as regards the beauty of the plant or of the flowers in the following season. The Antirrhinum may be cut quite back, when a succession of fine young growth will come on, ready for the following season's flower.

Thrift and London Pride (*Saxifraga Umbrosa*).

As edging plants these are very beautiful and useful for many inexpensive gardens, but it is necessary to

cut them in on both sides once a year, to keep them close and within the limits of what it is desirable they should be, as neat flowering edgings. This cutting in may be done either in the autumn or the spring, but I should prefer the month of July or August in which to do it.

Miscellaneous Plants.

There are numerous other plants used for edgings, &c., nearly all of which require trimming in annually, or nearly so, such as the *Golden Feather*, *Daisy*, *Sedum*, *Veronica*, *Iberis*, *Koniga*, *Peristrophe Angustifolia*, *Strachys lanata*, *Thyme*, &c. All these require more or less annual cutting in, or they will soon get out of order for such a purpose.

In concluding these remarks on the subject of pruning, I would observe that there are many plants which are not mentioned here which will require nearly similar or, in some cases, precisely the same management as regards the cutting in or pruning as those enumerated above, and severally treated under this head, the rules concerning which may be consulted when necessary.

PART VI.

ON MANURES, THE DISEASES OF FRUIT TREES, ETC.

Manures.

As Manure is an essential article in horticulture and floriculture, I think it not out of place, but rather to the purpose, to give a few hints to those amateurs who may not be well acquainted with the best kinds to use for particular plants. And although this is not strictly a treatise on growing trees and plants, yet the cultivation and pruning of them are so closely connected, that Manures and Soils form an important element in such a work, for if there is no growth there can be no necessity for pruning.

Almost all trees, shrubs, and plants require an annual manuring to maintain them in good health. Even forest trees require it, and get it too in the woods and forests, by the annual decay of the fallen leaves which cover the ground.

Decomposed vegetable matter seems to be the best adapted to trees and plants; and perhaps old cow-dung may be considered as a very suitable manure for a top-dressing for such as require this kind of treatment, after they have exhausted the roots by flowering and bearing a crop of fruits.

In reference to the Grape Vine, I have no doubt but that fresh cow-dung is one of the best manures to lay on the surface of the ground for that fruit-bearing plant, whether it is indoors or out of doors.

As regards the Peach and the Plum, much depends upon the nature of the subsoil and the staple soil as

well as upon the disposition of the tree. If the subsoil is of a rich alluvial clay, deep and nutritious, and the surface soil is good and upon the whole of a close texture, and the trees are young or even of medium age, and are disposed to give luxuriant growth, or only a good average medium growth, then no top-dressing will be required; but if the soil is poor and the trees are of only a medium or weak disposition—which is always shown, first, by the smallness of the young wood it makes, and, secondly, by the smallness of the fruit—then top-dressings of thoroughly decomposed stable dung and pulverised cow manure may be put on the borders from March until May, but not before March, unless the situation is exceptionally dry and gravelly, in which case they may be put on from January until April.

The Pear seldom or never requires top-dressings, for as a rule it always grows too free. Apples, especially old Apple-trees, require them frequently, using any strong manure. Fig-trees are like Grape Vines, and require good stimulants and all the sunshine the roots and branches can possibly get, with top-dressings of any decomposed manure, which should be laid on during the spring.

Gooseberries require a heavy top-dressing of any kind of fresh manure from the common sewer or cesspool, put on from November until January. The same may be done with Black Currants, and also Red Currants if they are weak.

Raspberries require a top-dressing as well as manure forked in if the land is dry and poor.

As a substitute, liquid manures may be applied to any of the trees above named, especially if they are in pots. This may consist of the contents of the cesspool put on while the trees are growing. It may be used in its original strength or diluted with pure water, according to the constitution and character of the object it is used for.

For Peaches and Plums on walls growing out of doors, care must be taken that the circumstances of

the case are well considered; but as a rule these will not bear very strong stimulants when so situated, as they generally make too much growth and have to be checked. When, however, they are old and appear to be weak, some strong liquid manure may be given them once or twice during the early growing season, say from May until July. It should be poured on the border and allowed to soak down; it is not at all necessary to pour it directly upon the roots close to the stem of the trees, but all over the border, and at a distance of six or eight feet from the stems. I have often been amused when I have seen manure applied in great abundance to a Vine quite strong within a radius of a couple of yards from the stem. "Poor Vines," thought I, "this will do you no good, but will ultimately kill you." I wish the theory of physiological botany was more studied by our young professionals —and some of the old ones too—then they would know full well that manure put only just about the stems of such trees as the Fig, Plum, and Peach, as well as the Vine, is of comparatively little use, especially in the case of trees that have been planted ten or fifteen years.

Let those who have Vines planted remember that as they advance in age so they progress and extend their feeding spongioles, or extreme roots, in search of nutriment; nor will they be confined within the limits of a few square feet. I have known Vines that have been planted in rich soil inside a vinery get through the front wall to the outside, and extend their ramifications some distance in the course of only two or three seasons from the planting, notwithstanding the soil inside was good. Therefore, whenever manure of any kind, whether it is solid or liquid, is applied either as a top-dressing or as an admixture with the body soil to established plants, let it be used all over the area, and for some considerable distance from the stems.

The Coniferæ.—Even these and shrubberies, where there are any valuable evergreen kinds, are benefited by the application of top-dressings of decomposed

vegetable matter, such as leaf-mould and peat; especially is this the case with flowering shrubs, such as *Rhododendrons, Kalmias, Azaleas, Berberis, Roses,* &c. The variegated Hollies especially will be benefited by good thick top-dressings of leaf-mould, more particularly if they have been recently planted.

Nothing suits Roses better than good top-dressings of decomposed stable dung put on from November until January.

Lawns.—We often have complaints about these becoming mossy, and are asked, "What can I do to remedy the evil?" The thing is too plain to be misunderstood. The lawn has become mossy through poverty, the land being exhausted. In such a case apply a top-dressing annually, consisting of old decayed stable manure, or moderate dressings with soot sown over the grass in March or April. Guano and Goulding's "special" may be sown over lawns which have become impoverished; but sand is useless, either to kill moss or to restore grass.

Guano will be found most beneficial to fruit trees of all classes when the plants are poor and weak and the soil is poor also; it must not, however, be used upon them during the inactive state of the trees, but during the commencement of the active state, say from February until July, April and May being the best time.

The Diseases of Fruit Trees.

As the diseases of fruit trees frequently have to do with the handling of them by way of pruning, &c., I think it most important to offer a few remarks in connection with this subject. I am more than ever convinced of the injurious effects of rashly and thoughtlessly digging the borders where Peach-trees and Plum-trees are planted, or even digging them at all. I agree with making good use of a south border under a wall carrying Peaches, Nectarines, and Apricots; and most people would be almost ready to sacrifice the fruit to obtain a good crop of very early Radishes, Potatoes, Dwarf French Beans, or Lettuce. I well know that the value

of these is a great inducement to hazard the chance of a crop of Peaches; but, upon consideration of the ultimate effect upon the trees, I advise never to dig the borders more than six inches deep, or not to dig them at all, which no doubt is the safest course, unless it is very carefully done.* Some will, no doubt, remark that this is contrary to my directions in "Multum in Parvo Gardening." I confess that it is so; and at the same time I will substitute a plan which will give results quite equal in value to what can be obtained from the borders described in that work.

Strawberries of a good productive kind, judiciously planted and well managed afterwards, will produce nearly an equal amount as regards value; nor will they prove at all detrimental to the Peaches, as no digging will be necessary on the borders, and if the plants are kept clean and detached, the ground will get as much sunshine as is necessary for the well-being of the Peaches. The Strawberries should be planted not less than twenty inches apart every way. Never fork or dig the ground at all, but lay the manure on it, which may consist of maiden loam one part, old decayed manure one part, and lime one part. This is a good top-dressing for Strawberries and also for Peaches.

The injudicious digging of the ground where Peaches, Plums, and Apricots are planted proves a source of many fatal diseases to them. In some cases I see that it causes the stock to throw up suckers, and when this commences it occasions no end of trouble and generally proves fatal to the trees, as the difficulty of eradicating these suckers (which come close to the stem and from the stem below the surface of the ground) will be as bad as the retention of them. When once they get deeply seated a constant recurrence of them will generally take place. The fact is, that through digging about the roots and stem of the trees, the roots close to the stem get cut or broken so constantly that they naturally emit shoots, as also do the branches; and by cutting them off annually a set of spurs is

* It may be done with a short-pronged digging fork, and the borders planted; see page 7.

formed below, towards which a natural current of sap flows, and it is a difficult thing to prevent this when once it is thoroughly established. It sometimes proves almost death to the trees to remedy this one evil, and it all arises from the mutilation of the roots by digging.

THE CANKER, OR GANGRENE.—This is a troublesome and in some cases a fatal disease. Some think it is caused by atmospheric influences, while others attribute it to the unsuitable state of the soil, and others again to the overgrowth of the branches. It seems rather difficult to determine which is the true cause, since not every variety of the same species is affected alike, although growing side by side. For instance, the Hawthornden Apple suffers more from this disease than most other Apple-trees; while some equally as delicate in character and growing upon the same spot escape, this sort generally gets it. Now, if it arose from atmospheric causes all would suffer more or less; if it is constitutional, then no one instance would be found exempt from it, which is not always the case, there being some instances in which no gangrene attacks this kind.

In my opinion, canker, or gangrene on trees arises not from anything in the air, nor from overgrowth, nor from pruning alone, but chiefly from the disagreement that exists between the state of the roots and the condition of the atmosphere; for instance, if the subsoil is too cold. It is something like a person living in a locality consisting of a cold clay, and which holds water, causing rheumatism and at the same time aggravating his appetite. The subsoil being so much below the heat of the air, and the roots not being in active operation with the demands of the branches, a weakening power exists among them, and, as a matter of course, those channels that are the weakest suffer first; hence a limb here and a limb there fails, there being perhaps some minor defect previously in that particular part, which becomes suddenly paralyzed, and, as a rule, gets beyond remedy. A bruise with the hammer, or a nail pressing against the branch, will produce the like effect,

although it will be found that there is a difference between a cankerous wound and canker produced from natural causes.

Some localities are more conducive to canker than others, and when this is the case among Peaches or Cherries, and it becomes very troublesome, I advise one of two things; that is, either to abandon the growing of those kinds which are so much subject to the disease, or to spare no pains to adapt the soil to the well-being of the trees. The borders should be raised well above the level of the natural soil (especially if the subsoil is of a cold nature), and this should be first of all dug deep and have an abundance of lime rubbish turned into the bottom. It should also have plenty of this mixed with the soil.

Maiden loam and coarse sand may improve the soil, and if of a flat, cold, and clayey nature, a good proportion of peat and decomposed leaf-mould may be mixed in deep with it. These composts will, no doubt, render a soil which is too cold for stone fruit suitable and productive in other respects, and will also prevent canker.

In pruning and cutting off large limbs, as I have said before, trim the saw-cut over with a keen-edged knife quite smooth, and then paint it with a little grafting-wax just warm.

Insects.—Fruit trees of all kinds are exposed to the attacks of various kinds of insects. The Plum is liable to be attacked by the blue aphides, the Peach to the green and brown kinds, and the Cherry to that of the black kind. Each of these pests appears suddenly in myriads, and if not quickly dispatched they will so increase that they will soon dispatch the fruit on the tree. In the orchard-house they are easily got rid of by fumigating, but on walls in the open air this is not so easily done. Powdered tobacco is a good remedy; and so is tobacco-water, and the clean solution of the Gishurst compound, not too strong, will also prove effectual. A strongly impregnated solution of stone-brimstone will no doubt be as good as anything, when

applied pretty freely to the trees by means of the syringe; but the chief thing is to apply the insecticide as soon as the aphides appear, and never to allow them to gain strength for a day; for the rapidity with which these aphides increase in the course of only one day is quite astonishing, and the bad consequences are equally as rapid, for the leaves and young shoots soon feel the effects of their presence.

THE RED SPIDER.—This diminutive pest is a troublesome one, and appears on Vines and Peach-trees during a dry atmosphere. Its presence is soon made apparent by a peculiar and mottled appearance in the leaves, which soon lose their healthy green hue. No time must be lost when this pest appears, but immediately apply the sulphur-water freely with the syringe. Ten or twelve pounds of stone brimstone broken up and put into a half-hogshead barrel without the head, with two pounds of soft soap added to it, then pour ten or twelve gallons of hot water on to the whole and stir it to dissolve the soap; let it stand for a day and a night, or as much longer as you can, then dilute it with clean water up to the half-hogshead; let it settle for a few hours and then dip out and syringe the tree infested overnight, and again with clean water in the morning if the fruit is getting to a good size. Clean water syringings will often arrest this pest if well followed up.

ON REMOVING FRUIT TREES.

I did not intend to say anything specially on this head, but as there will be a constant necessity for this in connection with the pruning and renovation of fruit trees, as well as for the greater convenience of the readers of this work, I consider it necessary to give a few hints to those who may require such information in order that they may avoid disappointment.

As I have remarked elsewhere in this work, it is no doubt really necessary that all gardeners, at the least, should be acquainted with the subterraneous action of plants, more especially as here lies their weal or their

woe. I do not profess to be an expert in the matter of vegetable physiology, but this I conceive to be true, that all plants, especially fruit trees, depend upon the number and health of the spongioles, that is, the sponge-like young fibres at the ends of the roots. Now, if these are not healthy, owing to the state of the soil, some bad results will soon arise and show themselves in the branches, fruit, &c. If the subsoil is uncongenial to these tender fibres—if it is too cold and wet, and impervious to the fertilising rays of the sun, or wet and water-holding, and soured—bad results in the branches will appear.

It makes no difference even if the ground is manured never so well; it is even worse than it would be if the land were poor and the other conditions favourable. I have seen Grape Vines that have been fairly killed by giving them overdoses of rich manure, so much so that the roots were buried quite out of the reach of the sun's rays, and notwithstanding the richness of the soil the Vines pined away, simply because the tender spongioles or fibres at the end of the roots could not consume the surcharge of nutritious matter, and there being no evaporation by the virtue of the sun's influence; and still more so is this the case with the Peach and the Plum.

I have been consulted by a gentleman who has wall trees, including the Cherry, Plum, Peach, and Nectarine, which bear scarcely any fruit worth naming. Well, I soon discovered what is the cause—not poorness but coldness of the soil, and too much manure put upon the roots. With Peaches and Plums this is far worse than no manure at all under such circumstances.

Be it remembered that Peaches as well as Plums send out their spongioles and extend them in proportion to the requirements of the branches of the tree, in search of food to supply them with; and let young gardeners always bear in mind that the extension of these spongioles is ever on the advance year by year, for as they get older they become converted into mere channels of a more solid nature, and new spongioles are made on

these in due time for the next season, and so the subterraneous action goes on year by year.

Few will credit the distance that the roots of trees will travel in search of food for the supply of the branches. I have noticed particularly that most kinds send out their roots a few inches under the surface of the ground, and this is the case with the Plum, the Apple, and the Peach. When the soil on which they grow is not dug, I have also found that the roots of Grape Vines will creep along a few inches below the surface, especially where the sun shines upon it. These facts go far to prove the necessity of giving the roots as well as the branches the benefit of the sun. I have further carefully noticed that when Plum-trees and Cherry-trees (and even the Pear) have been planted on north and north-west walls (which is frequently the case) that little or no fruit can ever be had from them. They grow freely enough, and there it ends; and I am more than ever convinced of the necessity for the careful study of physiological botany, or the underground action of trees, especially fruit trees.

A good slope facing the full sun all day is no doubt the best aspect for fruit trees in general, especially for the Pear, as the latter is more inclined to go deeper into the soil below than the stone fruits are. If the Pear is planted in a deep flat soil, the roots will penetrate deeper than they should, and the consequence is that they will grow too freely and bear less fruit; on the other hand, if planted on sharp slopes, the sun will get at the roots more readily, and the trees will not grow so freely and will bear abundantly.

Now, in regard to the lifting and transplanting of Peach and Plum trees, as they are treated in this work under their respective heads, I wish to say that, whenever it is necessary to do so, which will often be the case, as I have shown, and which must never be omitted when a Peach, Plum, or Pear gets to an over-luxuriant state, especially under the close "cordon" treatment and "renovation" plan, let me advise that the "lifting" and "replanting" be done carefully;

also to observe well to reserve as much as is possible of the fibres of the roots uninjured, unlacerated, and unbroken. Then take every care to lay these out in the hole made ready to receive the lifted tree.

It is in a great measure owing to the rash and heedless manner in which trees and shrubs are taken up and replanted that so many are lost. In the case of planting young trees, which have been obtained, it may be, from nurseries many miles off, allowance must be made; but I now more particularly refer to the lifting of the Peach on the spot, in order to check its too free growth.

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THE END.

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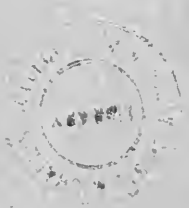
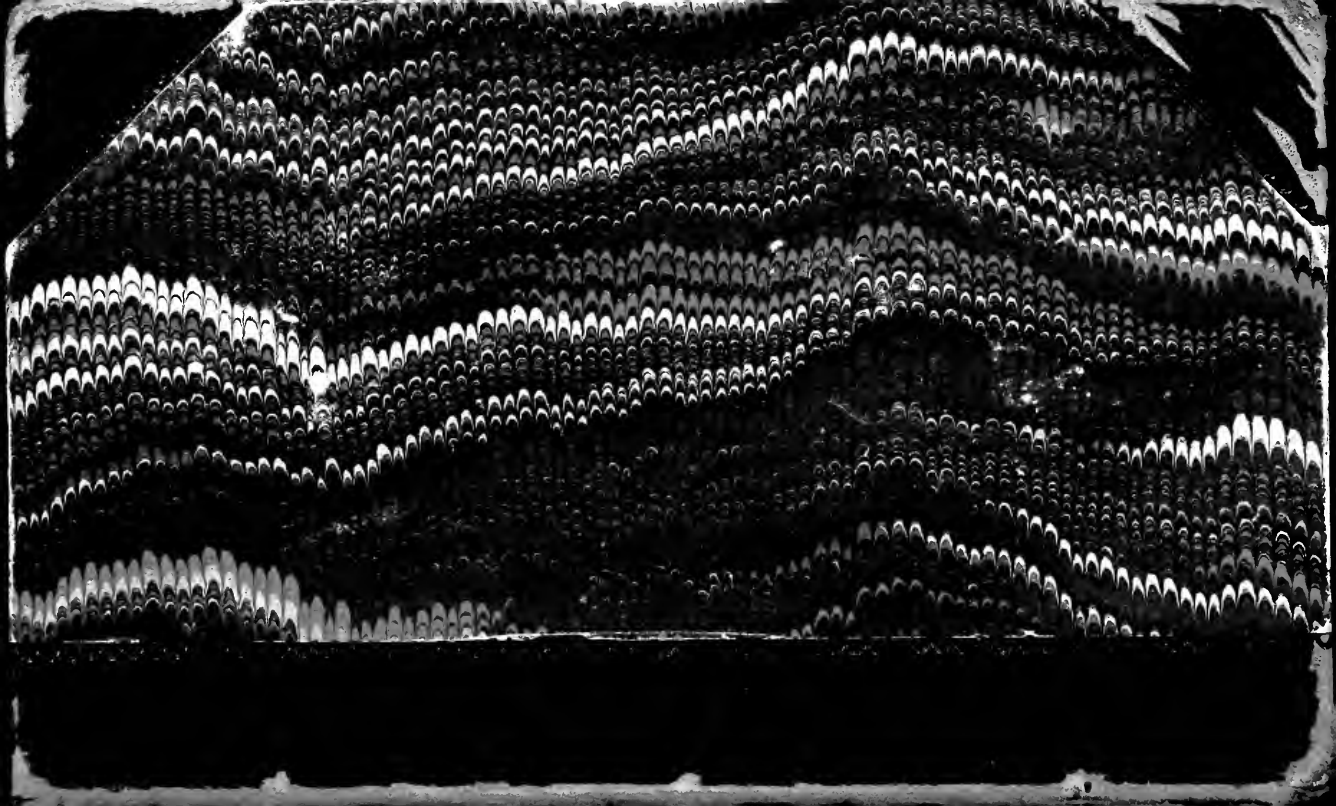


Wood, S.

The tree planter
and plant propagator

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